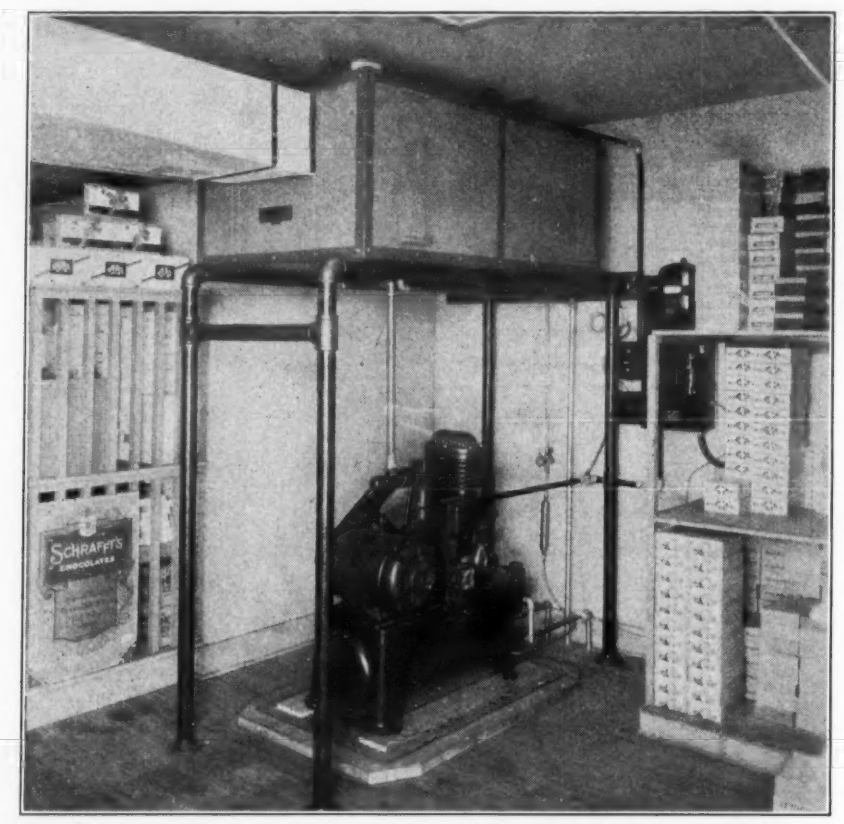
At Mart Show — These Kelvinator Officials Talked of Air Conditioning

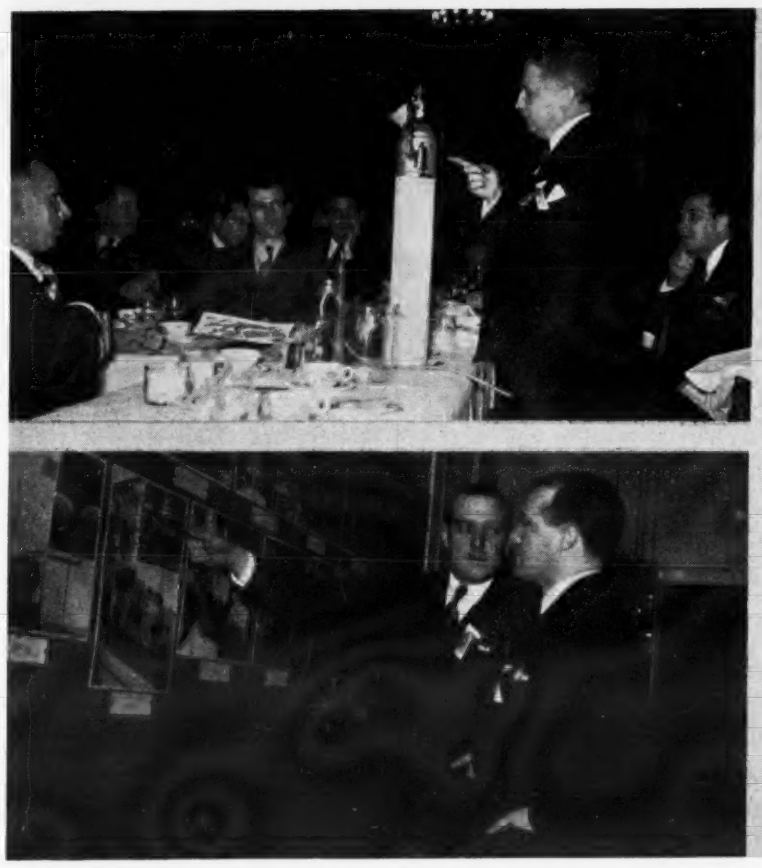
John K. Knighton, Kelvinator air-conditioning sales manager; John Garceau, advertising manager of the commercial divisions; and Charles Rickner, in charge of national sales, at the Chicago Merchandise Mart's housewares show where Mr. Knighton addressed department store executives on the possibilities for the sale of air-conditioning equipment.

Double Purpose — Installation Keeps Patrons Comfortable, Candy Edible



More than merely eliminating personal discomfort to human beings in hot weather, this York Freon air conditioner installed in a candy warehouse has helped to keep candy stocks in better condition and has permitted stocking of high qualities.

Westinghouse Air-Conditioning — Distributors and Dealers Get Sales Ammunition at Factory School

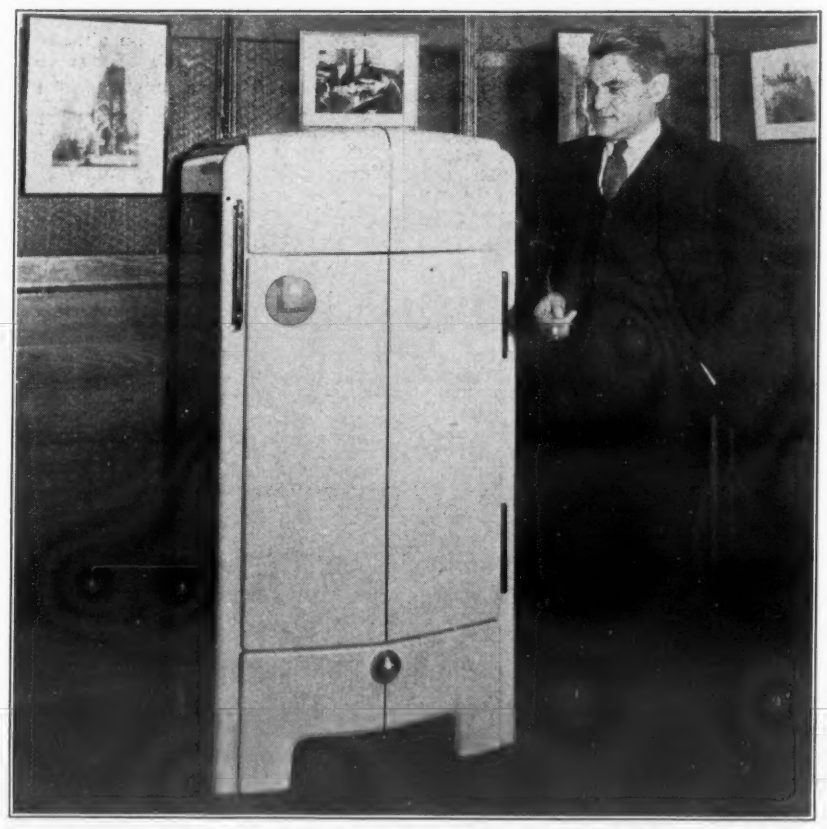


(Top) R. J. Thompson of Kinetic Chemicals speaks at the Westinghouse air-conditioning school and tells about the safety features and other factors in the use of Freon as a refrigerant in comfort-cooling applications. (Below) S. F. Myers, Westinghouse air-conditioning sales manager, shows a gallery of installation photographs to William B. Henderson, executive vice president of the Air Conditioning Manufacturers Association. Helyn A. Winans (right), saleswoman for the Eugene P. Kielh Co., Philadelphia distributor, was the only woman attending the school.

General Manager

John Wyllie has been placed in charge of all operations for Temprite Products Corp.

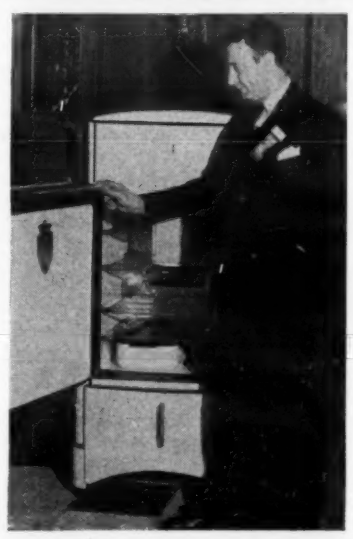
Sears Roebuck — Holds First Showings of Its 1936 Coldspot Model



Introduced to the public last week was Sears, Roebuck's 1936 Coldspot electric refrigerator. Pictured with the new model is Raymond Price, who was responsible for its development. New styling and added features, including a dry-storage compartment in the bottom, mark the line.

Leonard Distributors — Study Every Detail of the New Line before Leaving Convention with News for Dealers

(Top left): Julius Klein, Philadelphia distributor, is intrigued by the "baby" model in the new Leonard line. (Top right): Sam Mitchell (center) gets the ear of Harry Tracy of Ballou, Johnson & Nichols Co., Providence, R. I., while J. A. White, Grand Rapids distributor, quenches his thirst. (Bottom left): B. D. Colen of the Colen-Gruhn Co., New York, a newly-appointed Leonard distributor, gives close inspection to a new model. (Bottom right): The rearranging shelf holds the interest of Max Hegelman of Capital City Distributing Co., another new Leonard distributor.



York and Norge — Elect Lauer and McIntyre Vice Presidents of Firms

S. E. Lauer, formerly sales manager, has just been elected vice president in charge of sales of York Ice Machinery Corp.

George McIntyre was recently elected vice president of Norge Corp. in charge of national buyers' activities.

THE NEWSPAPER OF THE INDUSTRY

ELECTRIC REFRIGERATION NEWS

WRITTEN TO BE READ ON ARRIVAL

Registered U. S. Patent Office

ESTABLISHED 1926. MEMBER AUDIT BUREAU OF CIRCULATIONS. MEMBER ASSOCIATED BUSINESS PAPERS.

VOL. 17, NO. 6, SERIAL NO. 359
ISSUED EVERY WEDNESDAY

Entered as second-class matter Aug. 1, 1927

DETROIT, MICHIGAN, FEBRUARY 5, 1936

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'Economy' to Be Emphasized in Grunow Selling

Style & Mechanism Refined In 1936 Models; 5-Year Service Plan Offered

CHICAGO—1936 Grunow household electric refrigerators, manufactured by the reorganized General Household Utilities Co., are marked by refinements in styling and in the refrigerating mechanism, by added convenience features, and by the fact that they will carry a 5-year service protection plan.

Emphasis in Grunow selling plans for this year will be on the "economy" and "efficiency" of the rotary unit using Carrene as a refrigerant. A new demonstration kit has been provided to tell this story to prospective users.

This does not mean that the much-controverted "safety" theme which has been used by General Household Utilities ever since it first brought the Grunow Carrene unit on the market is to be abandoned. The demonstration kit will also be used to show that Carrene is a safe refrigerant.

Significant, however, is the fact "safety" is placed sixth on the list

(*Concluded on Page 2, Column 1*)

Jobber Qualifications Discussed by 2 Groups

CHICAGO—Directors of both the Refrigeration Supplies and Parts Manufacturers Association, and the National Refrigeration Supplies Jobbers Association, met in separate and later in joint meetings last Wednesday at the Palmer House here and took steps to further their aim of promoting better practices in the industry by cooperative action.

Much of the discussion centered about the qualification of jobbers under the definition formulated at the organization meetings of both associations in Detroit in October.

It is believed that a list of the

(*Concluded on Page 11, Column 5*)

Air Conditioning Exposition in Chicago Draws Huge Crowds—30,000 Register

* * *

By Phil B. Redeker & T. T. Quinn

CHICAGO—Some of the strongest evidence yet to be presented that the air-conditioning industry is rapidly coming of age was to be found in the exhibits and the attitude of the people viewing them at the Fourth Annual Heating & Ventilating Exposition held Monday through Friday of last week at the International Amphitheater in the Stockyards District here.

The 250 or more exhibits filled the entire second floor of the spacious amphitheater, and exposition officials in a check-up on the final day put the *registered* attendance at about 30,000 persons.

By registered attendance is meant

(*Continued on Page 7, Column 1*)

Carrier Field Force Hears Sales Plans

NEWARK—Between 400 and 500 distributors, dealers, sales engineers, and air-conditioning technicians, largest group in the company's history, attended the annual sales conference of Carrier Engineering Corp. at its main offices and plant here a fortnight ago, and heard Carrier officials outline a broad program of merchandising and promotional activity for 1936.

Following the sales conference was a school for dealers, at which all phases of air conditioning and refrigerating engineering practice were taken up.

The conference proper was opened

(*Concluded on Page 11, Column 1*)

McElhinny Dies in Dayton Hospital

DAYTON—William Dunbar McElhinny, 44, manager of the wholesale division of Frigidaire Corp., died Feb. 1, at Miami Valley hospital after an illness of nearly six months.

Attorney, newspaperman, aviator, and pioneer sales manager in the refrigeration industry, he was known throughout his own and many allied industries.

He is survived by his widow, Mrs. Elizabeth Wilson McElhinny; a son, Wilson Dunbar McElhinny; his mother, Mrs. William David McElhin-

(*Concluded on Page 11, Column 2*)

California Wholesalers Adopt Code of Ethics

SAN FRANCISCO—Domestic Refrigeration Wholesalers Association of Northern California, in a meeting here last month, drew up a series of resolutions prescribing recommended trade practices by refrigeration distributing organizations in this district.

Points covered in the resolutions include special discounts to customers,

(*Concluded on Page 18, Column 3*)

1935 Sales of 1,688,600 Units Is New Record

Estimated December Total Of 79,240 Also Sets A New High

DETROIT—Cracking all records, world sales of household electric refrigerators by manufacturers to distributing outlets, reached a total of 1,688,600 units during 1935, according to estimates made last week by ELECTRIC REFRIGERATION NEWS, following the receipt of the report of December sales by manufacturers who are members of the Refrigeration Division of National Electrical Manufacturers Association.

This final estimate for the year closely approximates the advance estimate of sales of 1,700,000 units which ELECTRIC REFRIGERATION NEWS made in its Jan. 1 issue.

The estimated total of 1,688,600 for 1935 compares with estimated world sales by manufacturers to distributors in 1934 of 1,390,000 units, a gain of nearly 300,000 units.

Estimated December sales by manufacturers to distributors of 79,240 units sets an all-time record for the month of December.

World shipments in December of household electric refrigerators by the 14 member companies of the Household Section of the Refrigeration Division of Nema totaled 73,703 units, and brought the total of shipments by Nema members for the year to 1,570,383 refrigerators, a new record. Previous record was established in 1934, when the member companies reported shipments of 1,264,221 units.

The comparative table of sales by states of Nema member companies for 1935 and 1934 shows that California was way out in front in the matter of increase in 1935 over 1934, with a gain of 90 per cent. Illinois showed an increase of 52 per cent.

A.S.H.V.E. Discusses Comfort Standards

CHICAGO — Outside temperatures which hovered near the zero mark didn't prevent the topic of summer comfort standards from being one of the main subjects of discussion at the technical sessions of the forty-second annual meeting of the American Society of Heating and Ventilating Engineers meeting here last week.

New—and surprising—data on comfort standards for summer air-conditioning practice were brought before the engineers by F. C. Houghten and Carl Gutberlet, and a digest of their report is presented on page 13 of this issue.

Another study in which test data was taken from human beings was outlined by C. E. A. Winslow and L. P. Herrington under the title "Subjective Reactions of Human Beings to Certain Outdoor Atmospheric Conditions" and reported on page 15.

One of the high spots of the convention was the broadcast by President John Howatt of the Society on the Armco program, which was dedicated to the subject of air conditioning. Mr. Howatt made the broadcast from the banquet Wednesday night.

The National Warm Air Heating and Air Conditioning Association also met in Chicago last Wednesday and Thursday and part of its sessions are reported on page 14.

Hermetic Unit Is Optional on '36 Crosley Models

Beauty Added by Terraced Design; Stora-Drawer Is Newest Feature

CINCINNATI—Striking new streamline design, a number of changes and improvements in convenience features, and a new hermetically sealed reciprocating-type compressor, available on both standard and deluxe units, characterize the 10 models in Crosley Radio Corp.'s 1936 line of household electric refrigerators.

Models range in size from 3 to 7-cu. ft. net capacities, and in price from $94.50, for the 3-cu. ft. unit, to $204.95, for the 7-cu. ft. deluxe unit with hermetic compressor. Prices include delivery, installation, and one year's free service.

Cabinets in the four larger models are "terraced," building up to a bulging one-piece shell top, which is removable for inspection or replacement of the compressor unit. The louvres formerly prominent in the Crosley top shell have been replaced by round apertures, concealed from view by location where the top shell meets the refrigerator door, and providing ample air circulation around the refrigerating unit.

Deluxe Shelvador models have a

(*Concluded on Page 2, Column 4*)

64 Conditioners Sold In Dallas in '35

DALLAS—Air conditioning had a record-breaking year here in 1935. The 64 installations made during the year just ended were within four of the total made in previous years, and brought the city's total to 130, with 4 524 connected horsepower load.

Encouraging note in Dallas' air-conditioning story for 1935 is the fact that the great majority of installations were made in the small size markets—homes, shops, offices, and small stores. Several installations of large capacity, however, were made.

Largest of these were three applications in office buildings throughout

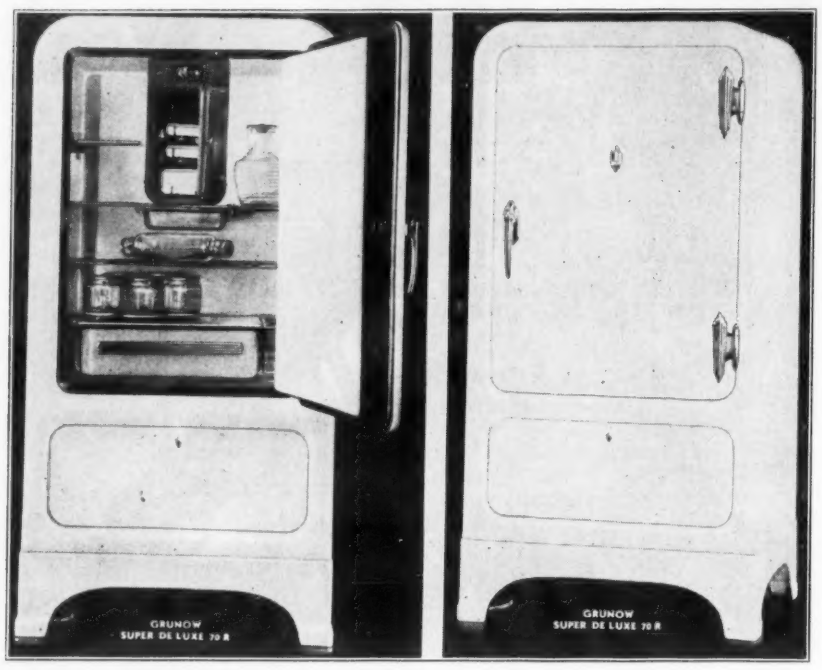
(*Concluded on Page 11, Column 3*)

General Motors Launches Spectacular Sales Promotion Program: The Parade of Progress

The "Parade of Progress," lined up in front of the General Motors Building in Detroit last Saturday morning (Jan. 29) for the christening ceremonies, after which the huge motor caravan started for Florida. It will make a 20,000-mile tour of the country.

Herbert R. Schaeffer, commander of the General Motors "Parade of Progress," shows F. M. Cockrell, publisher of Electric Refrigeration News, some of the points of interest of the special office car. See news story for further details regarding this original educational traveling exhibit.

Key Specifications of New Grunows



Model No.	Storage Capacity Cu. Ft.	Shelf Area Sq. Ft.	No. of Cubes	Lbs. of Ice	Exterior Dimensions Height	Width	Depth
Deluxe							
50-M	5.03	9.4	64	5	53	24½	24¾
51-M	5.03	9.6	128	10	53	24½	24¾
61-M	6.02	10.2	128	10	56½	24½	25½
58-M	5.6	10.78	128	10	56¾	25½	26¾
67-M	6.7	14.4	128	10	58½	29¾	26¾
Super Deluxe							
70-R	6.7	11.4	156	12½	58½	29¾	26¾
82-R	8.2	12.4	156	12½	62¼	31¾	26¾

Grunow Divides Line Into Two Series

(*Concluded from Page 1, Column 1*)

of Grunow main selling points this year in the company's sales literature.

The 5-year protection plan is similar to that which has been put in effect by other manufacturers in the industry; one year free service, and four years additional free service for $5 extra.

Cabinet styling follows that of the Grunow lines of other years, with one-piece, rounded-top construction and rounded corners on all lines. Hardware is of genuine chromium. Super deluxe models boast flush doors.

Dry-Zero insulation will be used and breaker strips on the door will be of Bakelite.

Waist-high, tip-proof shelves; a speed freezer, and freezing control with 11 speeds are some of the features common to all models which will be emphasized.

The 1936 line is divided into two series of models: a deluxe series of five models, and a super deluxe series which has two models.

Convenience devices include folding auxiliary shelves, automatic interior light, ice tray releases, glass storage and defrosting tray, triple-plated chrome evaporator with door, bottle space, removable shelf section for large food containers, porcelain shelf supports, finger-tip door latch, broom-high base, dessert freezer of more than ½-gallon capacity, and a frozen storage compartment.

The following accessories are standard with the super deluxe models: 20-quart sliding fruit and vegetable conditioner on roller bearings; five ½-pint leftover and storage covered dishes on a revolving base; glass refrigerator rolling pin; 1½-quart water bottle; automatic feed egg rack with a capacity of 12 eggs; two rubber ice cube trays.

A set of a number of these accessories may also be had with the deluxe models at a small extra charge, company officials have announced.

Sparton Appoints 3 New Distributors in Chicago, Portland, Omaha

JACKSON, Mich.—Sparks-Withington Co. has appointed three new refrigeration distributors, Frank M. Brown Co. of Portland Me.; the Commonwealth Utilities Co., Chicago; and W. M. Dutton & Sons Co. of Hastings and Omaha.

The Commonwealth Utilities Co., 1414 S. Wabash Ave., claiming to have the largest showrooms in Chicago, will distribute Sparton products in northern Illinois and northeastern Indiana. Four hundred attended the dealer meeting which the company held Feb. 3 at the Medinah Athletic club.

A fiftieth anniversary is being celebrated this year by W. M. Dutton & Sons Co. The company was established in 1886 and now has 22 men on the road traveling in Iowa, Nebraska, Kansas, South Dakota, Wyoming, and Colorado. Officials of the company are: H. O. Laisnon, president; F. B. Reed, vice president; E. L. Empkie, secretary-treasurer; and B. T. Oberg, assistant treasurer.

Frank M. Brown Co., 8-16 Free St., Portland, operates three branch stores and will handle Sparton refrigerators in Maine and part of New Hampshire.

Frigidaire Featured In General Motors' 'Parade of Progress'

DETROIT—Frigidaire Corp. and the newly-formed Delco-Frigidaire Conditioning Corp. will have important parts in General Motors Corp.'s "Parade of Progress," the unique traveling exposition which has just begun a 12 months' tour of America's smaller towns, carrying the story of the contributions of industry to individual and community welfare.

Frigidaire and Delco-Frigidaire products will be features in the caravan's housing exhibit, with its "Home of Yesterday" and the "Home of Today." The exhibit tells a story of the progress in living conditions—from the inconvenient, haphazardly-arranged kitchen of the early 1900's to the modern, well-planned kitchen of the present, with an electric refrigerator one of the principal items.

Air-conditioning equipment's place in the exhibit is in connection with the living room, the modern convenience of which is contrasted with the lamp-lighted, stuffy quarters of the past. Both unit room coolers and a central conditioning system of the furnace type are shown.

This "circus of science" will be carried by a fleet of eight specially built motor transports, themselves portents of the future; and the complete caravan comprises 28 vehicles, two miles long when in transit. Itinerary of the caravan during the year will cover more than 20,000 miles.

Six of the eight transports have sides which fold out and join together to form four rooms, in which the exhibits are housed. In transit, the sides fold in and the equipment is carried inside. Plans are to make overnight jumps between cities, in regular circus style.

The remaining two streamliners house a movie projection room, and the stage. These two are at opposite ends of the huge, silver-topped tent in which the show proper will be held.

In addition to the housing exhibit, other "sideshows" of the Parade of Progress will include a number of other educational exhibits, covering the advancements of industrial research, precision instruments and manufacture, safety, transportation, dependability, style, comfort, and economy.

Under the "main tent" will be shown motion pictures and demonstrations of the contributions of industry and research to better living. "The Comfort Zone," an educational film on air conditioning, has a leading role here.

The eight motor transports are streamliners, measuring 33 feet from bumper to bumper, 11½ feet from road to roof, and 8 feet in breadth. Three more are tractor-trailer units, one housing a Winston Diesel engine for lighting the tent and exhibit trucks, the second a locker room for the 40 men who are in the road troupe, and the other transporting the tent, speakers, and other equipment.

A selection of 1936 General Motors automobiles will make up the rest of the caravan, with the exception of the crew leader's office car, a specially built model on a Chevrolet chassis. This car, from which announcements will be made and most of the business of the tour conducted, has a Frigidaire unit cooler built into its rear compartment.

The cooler does not operate while the vehicle is in motion, but may be connected to the caravan's lighting system while it is set up in a town.

Data on Crosley Shelvadors

Model No.	Storage Capacity Cu. Ft.	Shelf Area Sq. Ft.	No. of Trays	No. of Cubes	Exterior Dimensions Height	Width	Depth
GA-30	3.0	6.92	2	42	36	23½	25
GA-35	3.5	7.44	3	63	50½	23½	25½
GA (GK)-43	4.33	9.07	3	84	56½	24	24¼
GA (GK)-50	5.07	12.34	4	105	56½	27½	24½
GA (GK)-60	6.01	14.37	7	168	58½	30	26½
GA (GK)-70	7.0	15.68	7	168	58¾	33¼	26¾

'35 Crosley Models Given New Styling; Hermetic Unit Added

(*Concluded from Page 1, Column 5*)

new feature, the Stora-Drawer, at the bottom of the refrigerator, and handy as a storage place for potatoes, onions, or other bulky items, and canned or bottled goods, which otherwise might take up miscellaneous kitchen space. The Stora-Drawer is not refrigerated, and utilizes below-the-refrigerator space ordinarily wasted.

On each of the four larger models, four options are available to purchasers: (1) standard or GA cabinet with self-contained removable unit; (2) standard cabinet with hermetic unit; (3) deluxe or GK cabinet with self-contained unit; and (4) deluxe cabinet with hermetic unit.

Smallest model in the line, GA-30, has a capacity of 3 cu. ft., and 6.92 sq. ft. of shelf space, two ice trays making 42 cubes per freezing, and a porcelain top, which makes it useable as a table. Price of this model is $94.50.

Next model, GA-35, has 3.5-cu. ft. capacity and 7.44-sq. ft. shelf area, three ice trays with a capacity of 63 cubes, and list price of $99.50.

Models GA- and GK-43 have storage capacities of 4.33 cu. ft. and shelf areas of 9.07 sq. ft., two regular and one double-depth ice trays with capacities of 84 cubes. Price on model GA, with standard unit, is $119.95; hermetic unit, $129.95; model GK, standard unit, $129.95; hermetic unit, $139.95.

Models GA- and GK-50 have 5.07-cu. ft. capacities and 12.34-sq. ft. shelf areas. There are three regular and one double-depth ice trays, making 105 cubes. GA-50, with standard unit, lists at $137.95; hermetic unit, $149.95; GK-50, standard unit, $154.95; hermetic unit, $169.95.

The GA- and GK-60 models have capacities of 6.01 cu. ft., shelf areas of 14.37 sq. ft., and six regular and one double-depth ice trays, with capacities of 168 cubes. Prices on this model are: GA-60, with standard unit, $149.95; hermetic, $164.95; GK-60, standard unit, $169.95; hermetic, $184.95.

Largest models, GA- and GK-70, have capacities of 7 cu. ft., shelf areas of 15.68 sq. ft., and ice cube capacities of 168 cubes. Prices on this unit are: GA-70, standard unit, $169.95; hermetic unit, $184.95; GK-70, standard unit, $189.95; hermetic unit, $204.95.

Handles on the new models are of the feather-touch type set vertically, and operate easily with either a push or pull of the elbow, knee, or finger.

The familiar Shelvador, this year as always a Crosley feature, has been changed slightly to include a shelf on which are set three square glass jars. Quick-action ice tray releases are included as features of the 6- and 7-cu. ft. models.

All deluxe models also have another Crosley innovation—the Crosley Crisper, in which vegetables of all kinds may be kept garden-fresh, and which is also useful for chilling salads, fruit dishes, candy, sea foods, or gelatin, or for storing extra ice cubes.

Interior of all the models is of acid-resisting porcelain, and exteriors are all of Dulux. All models with the exception of the 3-cu. ft. table Shelvador have automatic interior electric light. Shelves are of the flat-bar type.

Mechanical feature of the new Crosley is the new hermetic-type refrigerating unit, available on all models at a slight extra cost. The new unit, which is said to be exceptionally efficient and economical, is mounted in a dome, and has the appearance of a rotary-type compressor.

The unit, however, is of the reciprocating type, operated by what is known as a "Scotch yoke" instead of a connecting rod. Suspended on four springs to eliminate vibration, the compressor is claimed to be unusually quiet and smooth-running.

Built of corrugated, rust-proof steel, the freezing unit is of sturdy construction. Liquid is supplied to the unit by a patented Crosley feature, said to insure easy starting and maximum freezing efficiency. Freezing units of the 6- and 7-cu. ft. models are of double width, and have a middle shelf full of circulating refrigerant to provide extra-fast freezing.

"AN OLD NAME IN A YOUNG INDUSTRY"

CURTIS

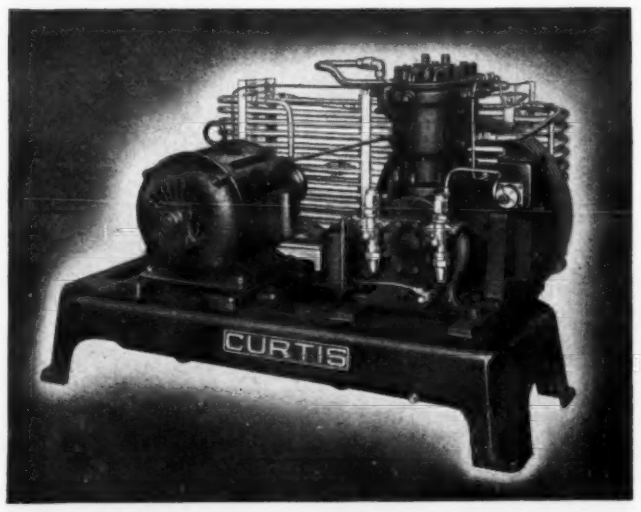
Specify CURTIS and be sure

ELECTRIC REFRIGERATION AND AIR-CONDITIONING UNITS

The sure way to satisfaction from a refrigeration or air-conditioning installation is to be certain that its most vital part—the condensing unit—is built by Curtis. Their constant, trouble-free performance is the result of 41 years' specialized experience in building fine compressors.

Complete Line—59 Units • Extra Capacity • Slow Operating Speed • Experienced Design • Low Upkeep • Rugged Construction • Fine Materials and Workmanship

Curtis enjoys the highest capital and credit rating—a Curtis product won't become an "orphan".



CURTIS Curtis Refrigerating Machine Company
Division of Curtis Manufacturing Co.
1912 Kienlen Avenue — St. Louis, Mo.

In Canada:
Canadian Curtis Refrigeration Co., Ltd.
20 George St., Hamilton, Ont., Can.

A NEW DEAL . . .
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PARTS and ACCESSORIES for all makes of REFRIGERATION and AIR CONDITIONING UNITS.

Complete Warehouse Stocks at your disposal—Every part and accessory fully guaranteed. Orders filled and deliveries made promptly and accurately.

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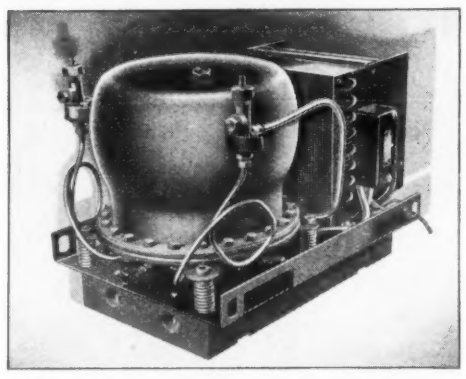
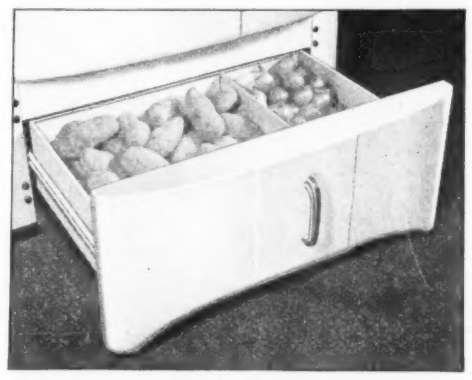
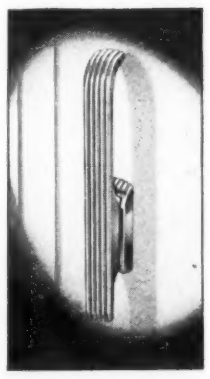


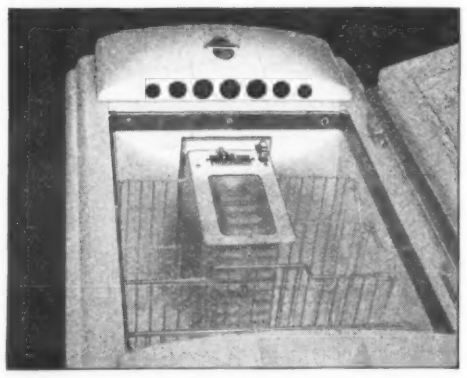
New super-economy Hermetic compressor available on most models.



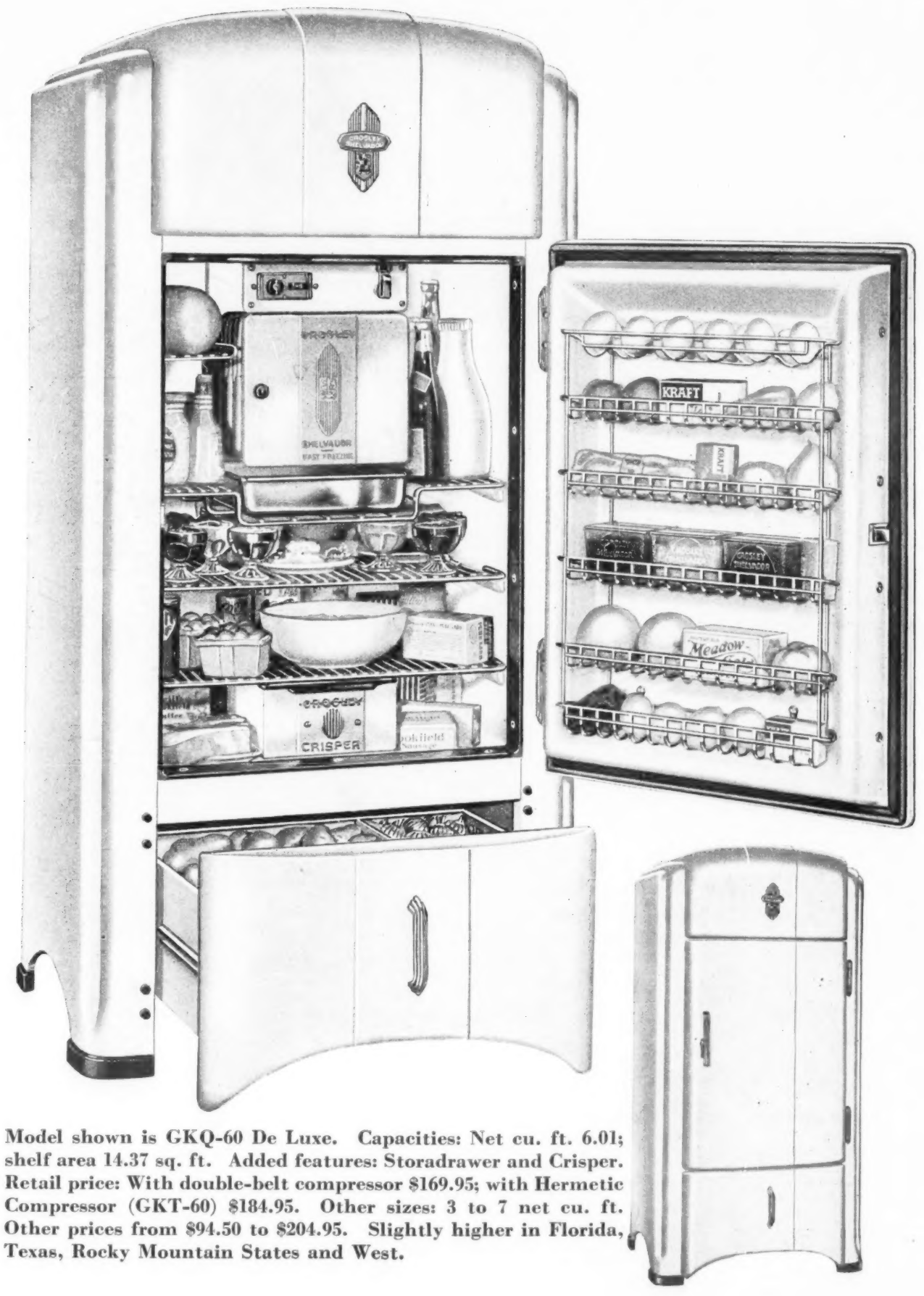
Convenient, non-refrigerated Storadrawer



Knee-action, feather-touch door handle



Ventilated front



Model shown is GKQ-60 De Luxe. Capacities: Net cu. ft. 6.01; shelf area 14.37 sq. ft. Added features: Storadrawer and Crisper. Retail price: With double-belt compressor $169.95; with Hermetic Compressor (GKT-60) $184.95. Other sizes: 3 to 7 net cu. ft. Other prices from $94.50 to $204.95. Slightly higher in Florida, Texas, Rocky Mountain States and West.

The new Crosley Shelvador completely restyles the electric refrigerator. Beautiful, smart, completely out of the ordinary. And with the new design goes a new convenience, utility, and value. So many are the new features that they cannot all be illustrated on this page. The few shown indicate their far-reaching importance. Ice cube capacity has been increased about three times in some models. A more scientific shelf arrangement gives even greater strength to the slogan: "This Much More in a Shelvador." More than ever: No dealer can afford *not* to handle Crosley.

THE CROSLEY RADIO CORPORATION

(*Pioneer Manufacturers of Radio Receiving Sets*)

Home of "*the Nation's Station*"—WLW—most powerful in the world—70 on your dial

POWEL CROSLEY, Jr., *President* CINCINNATI

Around the World

With George F. Taubeneck

The above picture of George Taubeneck was taken by Clarence F. (Sandy) Pratt, president of California Refrigerator Co., 1077 Mission St., San Francisco, on Saturday afternoon, Jan. 25, just before the *S.S. Malolo* sailed for Honolulu.

While in San Francisco, Editor Taubeneck was honored by a luncheon given by the electric refrigeration distributors of the city. Details about the meeting and impressions of San Francisco activities will be reported by the editor in his "World Series" articles to appear March 4.

The following story tells about Mr. Taubeneck's brief visit in Dallas, Tex., on the trip by automobile from Detroit to the Pacific Coast. In next week's issue he will tell about El Paso, Tex., and Phoenix, Ariz. Numerous pictures of interesting scenes along the "Apache Trail" will appear with the coming instalment. The Feb. 19 issue will feature the 1936 San Diego Exposition and will include several pages of pictures, including the refrigeration exhibits at the Fair.

Mr. Taubeneck arrived in Hawaii, Jan. 30, and will remain until Feb. 10, when he will board the *S.S. Mariposa* bound for Samoa, Fiji Islands, and Australia. He will arrive in Sydney, Feb. 24. (He was previously booked on the *S.S. Aorangi*, due in Sydney on Feb. 22.)

Nobody Home In Dallas

When first we began making the rounds of Dallas refrigeration houses, it seemed that most of the sales executives had gone back to Old Home Week in Indiana, or someplace.

EVAN MOON, manager of the Frigidaire branch there was in Dayton. Men from Texas Radio Sales Co., who direct Norge sales were in Muskegon. Nobody was home at Westinghouse Electric Supply Corp., according to the information desk.

Even more disappointing to us personally was the absence from the city of TOM CARRAWAY, president of the Carraway Engineering Co., air-conditioning contractor.

Tom, a tall, rangy, raw-boned, gentlemanly, drawling Texan, typifies to us all that is admirable and delightful about the race of gentle giants who inhabit the Lone Star state. In addition, he is a highly respected engineer, and is always gratifyingly well informed on the air conditioning business in the Southwest.

For years we have been chinning with Tom at A.S.R.E. conventions; and we had been hoping to have lunch with him on his home grounds.

* * *

Glenn Wasson Goes Up

But it was when we walked expectantly into Electric Household Appliances, Inc., and asked for our old friend, GLENN WASSON, that we received our biggest surprise.

No, Glenn wasn't managing the G-E distributorship in Dallas any more. Huh-uh. He'd gone to Bridgeport, Connecticut. Yeah, General Electric Supply Corp. That's right. He's vice president of the Supply Corp. now, in charge of refrigeration sales. Uh-huh, Hotpoint refrigerators. Yes, suh, we sure miss Glenn around heah. Mahty fahn fellah.

Judging Glenn's knowledge of and experience with electric refrigeration merchandising by the conversations we've had with him at various meeting places—Cleveland, New York, Bermuda, Miami, sailing the Atlantic, flying to Detroit—Glenn richly deserved this promotion.

Not only does he know what it's all about, but he has the kind of temperament and understanding of human nature which seem to make for executive success.

But we were not without friends. TOM SAWYER, the fine looking, courteous salesman who was on the Electric Household Appliances floor at the time, ushered us into the office of Retail Salesmanager E. S. (DICK) RICHARDSON.

"Hi, theah, George," greeted Mr. Richardson, "I met you on the Toppah's trip to Bermuda. On the boat. Remembah?

"Say, I thought you wunt comin' daown this way. Read about youah trip in the NEWS, but thet thingamajig around youah pictuah had you goin' by Oklahoma City, an' thetaway. Sit down."

* * *

Footprints on the Sands of Time

Mr. Richardson belongs to the Old Subscribers Club. Never misses an issue of ELECTRIC REFRIGERATION NEWS. Uses it regularly in sales meetings. Likes best the interviews with and personality stories about refrigeration executives.

These stories make excellent inspirational material for salesmen, he finds.

Optimism, hope, ambition—these are the very essences of a salesman's make-up. And when he can read about the men who have risen to the top of the heap in his line, how they act and think, what they do and talk about, he is encouraged to go out and leave some "footprints on the sands of time" himself.

Mr. Richardson also points out to his men the short news items which tell of sales achievements registered by dealers and salesmen in other localities.

Canvassing—Success

Canvassing is a religion with Mr. Richardson. All his salesmen—and he expects to have a crew of 90 out in the field within two months—cold canvass daily (and make night calls!).

"It's simple to become a successful electric refrigeration salesman," he tells his men. "All you have to do is take the La Salle training course, read ELECTRIC REFRIGERATION NEWS, and canvass."

For 1935 Mr. Richardson and his crew ranked No. 3 among all G-E distributorship's retail sales forces in sales achievement. The JUDSON BURNS Philadelphia retail selling crew, headed by the able JOHN CONVERY, was *first*.

Richardson's men sold more than 1,600 G-E refrigerators in 1935, an increase of some 300 over their 1934 record. They also sold 30 ranges and nine dishwashers.

Another star-in-the-crown figure: More than $40,000 worth of air-conditioning equipment was booked by this concern in the month of January, 1936.

New salesmen are obtained by personal contact, and are brought in by older members of Richardson's organization.

He is proud of the results he has had from his four-day intensive sales training courses. Tom Sawyer, a real star, is a product of the last one Mr. Richardson conducted.

* * *

Hard to Get Away

For years "Dick" Richardson was a popular professional musician in Dallas. He played the pipe organ at the city's largest theater, and for a number of years led his own dance band at the Adolphus hotel.

So he is widely and favorably known around Dallas. He did his best to persuade us to muss up our schedule by staying longer in Dallas, baiting his hook by offering to get up a party of the town's leading newspapermen and other celebrities.

Almost we did, for Dallas is a live city.

* * *

Frigidaire Strong

As mentioned previously, EVAN R. MOON, Frigidaire branch manager in Dallas, was not home when we called. But his two young assistants, ERWIN S. HAGLER, secretary, and M. B. LANE, warehouse supervisor, were there when we called the second time.

They told us that this Frigidaire branch has nine dealers in Dallas, and a few in the surrounding territory. This branch is hooked up with another one in Fort Worth, which is headed by P. M. BRATTEN.

These three men comprise the Dallas Frigidaire staff. There is no retail selling force, this branch simply being a warehouse operation. The office is a tiny cubbyhole in the warehouse proper.

But don't let that fool you. Even their competitors rank Frigidaire first in that territory. (The Frigidaire men say that G-E and Coldspot are their leading competitors).

* * *

Merchandising Set-Up

Mr. Moon acts as a sales manager for the territory. He conducts dealer meetings and sales schools, draws up campaigns and programs, and puts factory ideas into local practice.

On the side he sells commercial equipment, contacting large industrial plants and business houses. JOE HOPPE is his commercial dealer, and the Viking Air Conditioning Co. is the Frigidaire air-conditioning dealer in Dallas.

Dallas Power & Light Co. has Frigidaires (and other makes) in actual operation on their display floors; and Moon encourages the utilization of this service by Frigidaire salesmen. He doesn't favor home demonstration, his boys say, unless the sale is practically "in the bag."

Leading department store of Dallas, Titche-Goettinger, handles Frigidaire exclusively (although "Dick" Richardson has been working hard to get a G-E store-within-a-store set up there, and may have it by the time this is published.

Under the aggressive direction of HARRY DABBS, manager of the store's refrigeration department, Titche-Goettinger employs a staff of *outside* salesmen, who really go after business.

Backed by powerful newspaper advertising, Titche-Goettinger sold more refrigerators (they claim) in 1935 than anybody else in Dallas. We don't have the official total, but were told that the figure has four digits.

* * *

Milkmen Report

One of Titche-Goettinger's promotional stunts is to hang a yardstick, wrapped in a big paper sheet imprinted with an advertising message on appliances, on the doorknob of every home of any financial standing in the community.

Other Frigidaire dealers in Dallas get prospects through milk men, who report to the dealers the names and addresses of customers with inadequate refrigeration facilities.

If the prospects are sold, the milkmen reporting them are rewarded. This arrangement has been made with milk deliverers from every important dairy in the city.

Led by Titche-Goettinger, the Frigidaire dealers of Dallas sponsored a joint radio program last year.

* * *

Friendly Hustlers

Maybe it's a dinky little statistic, but when we heard that Dallas, Texas, is first among all cities of the nation in per capita express business, we said: "Yep, that's it—that's Dallas all right—not freight, but *express*."

It's a city of people in a hurry—but people, nevertheless, and fortunately, who do not indulge in hastening at the expense of the pleasant social amenities. Despite the dispatch with which Dallas individuals get things done, they're as friendly a tribe of humans as ever you saw.

Young man's town is this Dallas. Fact is, the community itself is pretty young. Vital statistics: Born in 1841, sired by log-cabin-builder John Neely Bryan from Tennessee, whose followers called their settlement Peter's Colony, at first. Godfathered in 1845 by George Mifflin Dallas, who was Vice President of the United States during Polk's administration. Incorporated as a town in 1856; as a city in 1871. Population (last count): 331,244, including Dallas, Highland Park, and University Park.

Within less than a century this pioneer settlement of 'dobe hutches and the good old standard log cabins, has grown vigorously to a fast moving, highly modern city with fine hotels, big factories, and all the appurtenances of American commercial civilization. Dozens of its buildings can be termed skyscrapers, some towering nearly 30 stories high.

Old John Bryan's cabin is now on exhibition in the museum at Buckner Orphans' Home. It was moved there some time ago. But that wasn't all these hustling Dallasites transplanted. They moved the river alongside which Bryan camped!

This river, the Trinity, has been John Bryaned several hundred yards to a new location. It has been straightened, too, and confined sedately between sturdy levees.

It took 25 million bucks to swing this job, but Dallas men think it was worth it; for not only did this major operation on the earth's surface blockade possible future floods, but it reclaimed some 10,000 acres right in the center of town.

Emphatically Dallas is not a one-product town. It has diversity to a high degree, diversity which insures against local booms or panics.

Oil, of course, pours black gold into the city. Southwestern headquarters for most of the oil refining concerns are here. Within a sleeper jump from Dallas are located wells which pump out from the earth's reservoirs more than 60 per cent of the world's crude oil production.

Take agriculture, too. All around Dallas is rich black soil, the kind in which even the most unscientific of farmers can't seem to lose.

Leather goods, cotton gins, cottonseed products, women's hats, women's washable dresses, cement, candy, flour and feed, tents and awnings, petroleum products, and farm implements are all leading—and steady—Dallas products. More than 750 manufacturers have wheels turning in Dallas.

As a trading center Dallas is even more important than as a producing city. It has the largest inland cotton market in the world, and leads the nation as a "spot" cotton market. Dallas is a big dry goods and wearing apparel market. It has more branches of national organizations than all other Texas cities combined. It has at least 500 wholesalers, and is headquarters for more than 5,000 traveling salesmen (when they all hit town at once, oh boy!). It is the center of the southwestern insurance business. It has the biggest telegraph office in the United States, and the largest telephone toll center south of Chicago. It has two fine airports, and four airlines in daily operation.

All that bespeaks not only hustle, but a *love* for business. It's a nice place to work, what with its temperate climate, (and low humidity), cheap fruits and vegetables in all seasons, low rents, lack of major distractions, lively business and social organizations, and its *cleanliness*.

Because natural gas is so abundant, the smoke nuisance does not hang a murky pall over Dallas. The air is clean, skies are bright, streets are wide, parks are numerous and well spotted, and the outdoor world seems a pleasant place, indeed, down there.

Sporting blood runs fast in Dallas. Recently the college football spotlight has been hogged by Southern Methodist University of Dallas, and by neighboring Texas Christian and Rice Institute.

Arlington Downs is, as you probably know, one of the country's best-patronized horse racing plants. Dog racing goes big, too, and wrestling and boxing. Dallas has a Texas League baseball franchise, and a professional football club.

Every year since 1886 Dallas has played host to the Texas State Fair, which overshadows any other state fair you ever saw. It pulls more than a million visitors each year.

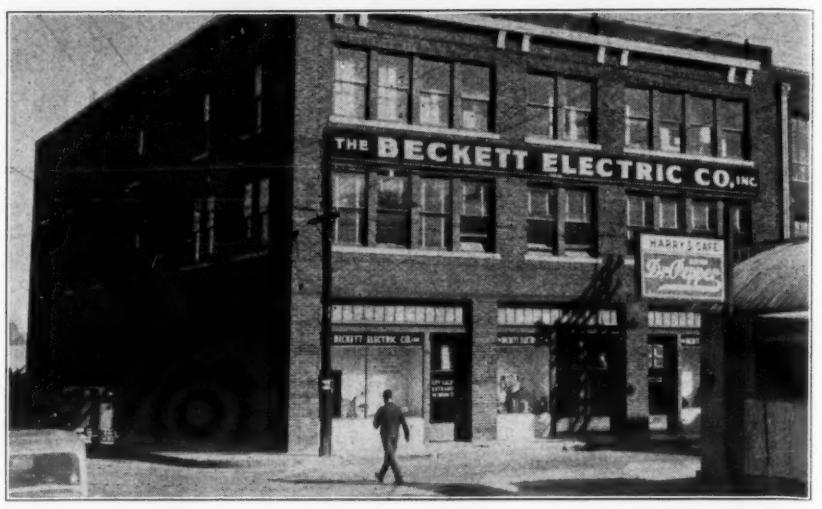
This year it will be held June 6 to November 29, and will be known as the Texas Centennial Exposition. We'd like to go.

One thing more, and we'll leave Dallas. Perched 200 feet above the scurrying pedestrians on the streets, the University Club of Dallas occupies a skyscraper penthouse—plus a *garden* of flowers, grass and shrubbery (not just weakling potted plants, but a green, healthy, growing garden).

Here gather some of the friendliest, best informed, go-gettingest gentlemen you'll encounter in many a long day's ride. And somehow, you believe with them that Dallas has just begun to fight.

Refrigeration Supplies

For Service Men in Dallas and Environs



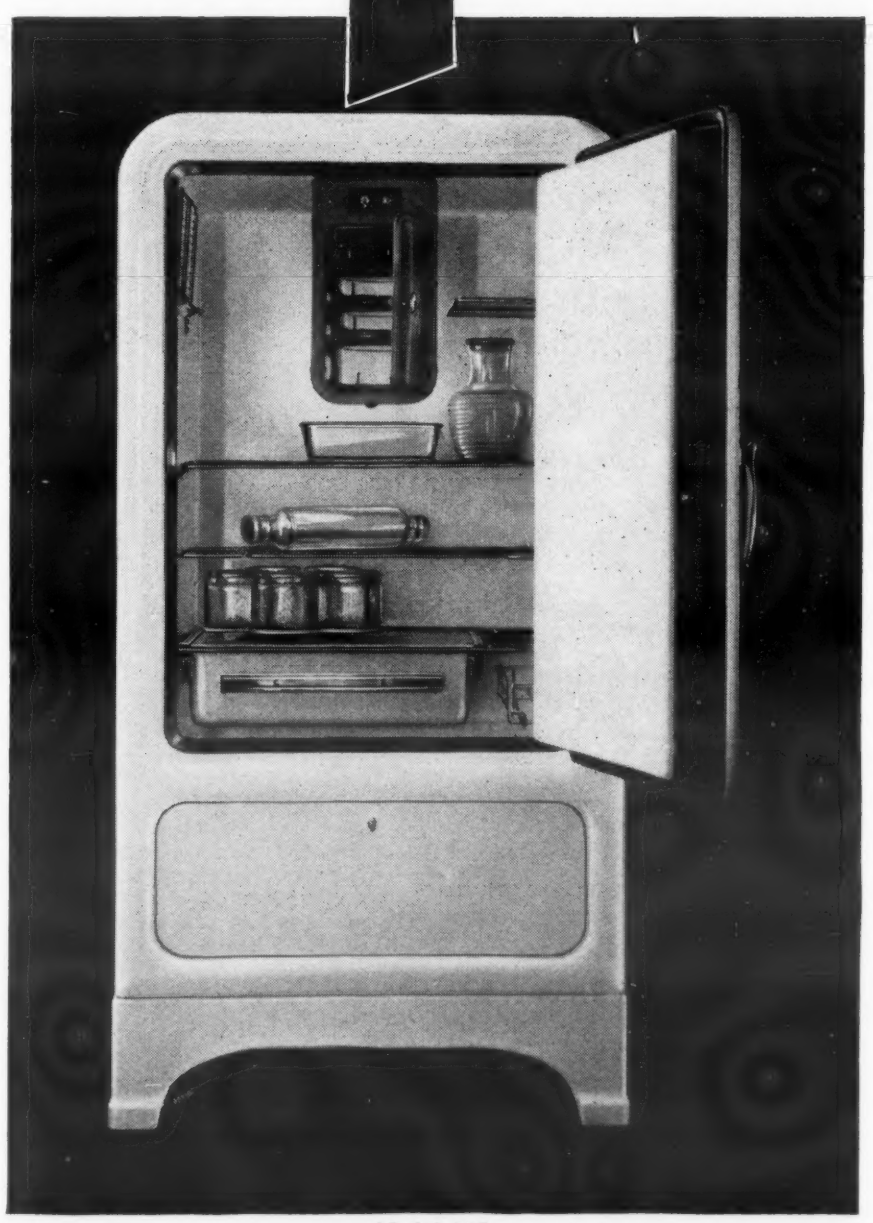
Canvassing Makes Sales

Dick Richardson Tells George Taubeneck Why His Dallas Sales Forces Ranks High

"THE TEAM THAT WON'T BE BEATEN—CAN'T BE BEATEN."
—*Rockne*

Grunow

HAS DONE IT AGAIN!



Model 82R

☆

1936 LINE WITH SAFE, MAGIC CARRENE IS HERE!

☆

PRICES AS MUCH AS 25% LOWER!

☆

SEVEN BEAUTIFUL NEW MODELS WITH SEVEN SMASHING SUPERIORITIES!

☆

● Thousands of new 1936 Grunow refrigerators being shipped to distributors from Pacific to Atlantic, from the Gulf to the Great Lakes make a thunderous crushing reply to those who said it couldn't be done.

Grunow has done it . . . again.

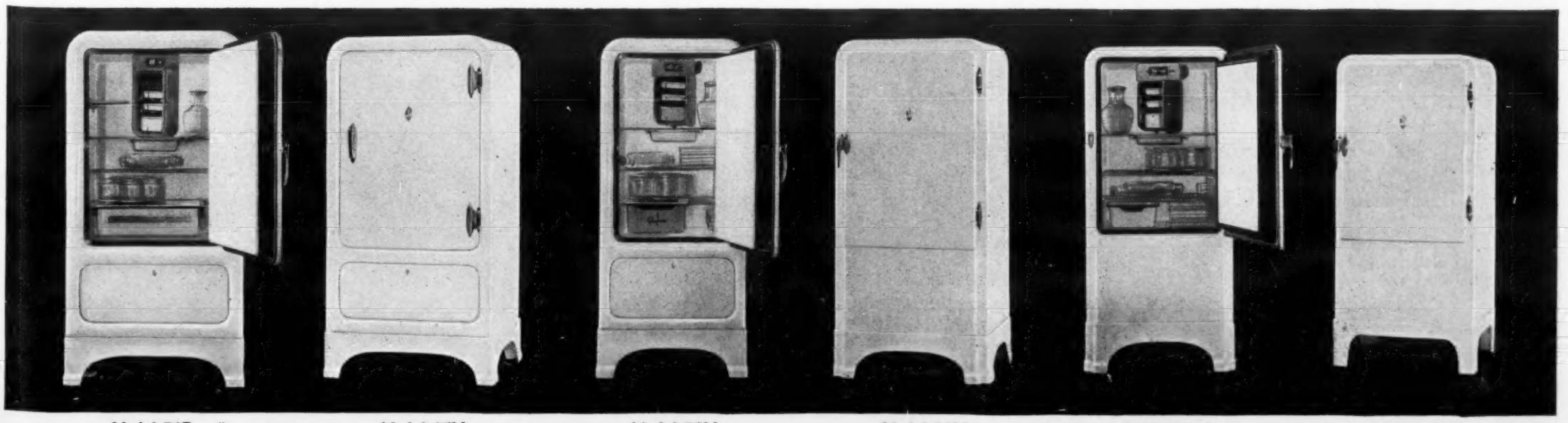
Better refrigerators at lower prices.

And on time—for these new Grunows—all models—will be in the hands of distributors before the end of this month.

This is the dealer's opportunity to make real money . . . a sound proposition . . . a store or home demonstration never equaled for closing sales . . . merchandise that makes friends. General Household Utilities Company, Chicago, Ill. Also makers of the famous Grunow Radio.

The demonstration that sells women

GO WITH GRUNOW IN 1936



Model 70R Model 67M Model 58M Model 61M Model 51M Model 50M

Around the World

With George F. Taubeneck

Letters to the Editor

Auckland Hot & Muggy—No Air Conditioning Yet

John Burns & Co., Ltd.
Hardware and Metal Merchants
Customs St. East,
Auckland, New Zealand
London Office: King William St. House
10th January, 1936.

Mr. Taubeneck:

We were very interested to receive your letter of Nov. 25 in connection with your contemplated world tour.

We would indeed be very pleased to make your acquaintance and sincerely hope you will not overlook this country in your itinerary.

Air conditioning is absolutely in its infancy here, in fact the writer knows of no straight air-conditioning plant operating in this country. The refrigeration field is also coming into its own and large business has been done during the summer months.

It is almost certain that if you come here by the Oceanic Steamship Line you will be sure to arrive in Auckland and if you could notify us a little before-hand we would be only too pleased to meet you on your arrival and put you in touch with the interested parties.

Regarding the places of visit, Auckland is, without a doubt, the principal city in this country for refrigeration as it is situated in the North Island where the climate is extremely hot and muggy in the summer months and very mild in the winter. As we go further south the towns become smaller and the climate somewhat colder and you might run across interested parties further down. However, we think if you should come to New Zealand, Auckland will interest you most and we look forward to seeing you in the near future.

F. Palmer, Mgr.,
Engineering & Tool Dept.

(Editorial Note: Mr. Taubeneck has been informed, by cable message to Honolulu, regarding receipt of above letter. The following letters from Sydney arrived in Los Angeles on the "Mariposa," Jan. 25, and were received in Detroit Jan. 30. Originals were mailed the same day to Mr. Taubeneck via the "Mariposa," sailing from San Francisco Feb. 4, and should be delivered to him when he boards the "Mariposa" at Honolulu, Feb. 10.)

Australians Waiting to Extend the Glad Hand

F. C. Lovelock, Ltd.
Manufacturers' Representatives and
Refrigeration Supplies
235 Clarence St., Sydney, Australia
7th January, 1936.

Mr. Taubeneck:

Your letter of Nov. 25 has just been received by us, and as we have mentioned in previous correspondence, we are looking forward with great interest to making your acquaintance whilst you are in this country. No doubt we will hear further of the exact date of your arrival and departure, so that we can make the necessary arrangements and do everything in our power to make your stay a pleasant one, and we also believe that we can be of great help to you in arranging contacts with the important people in the refrigeration field in Australia.

Already we have passed the good news around and there are many folk waiting to extend to you "the glad hand."

With all good wishes that the trip from the U. S. A. to Australia will be a pleasant one.

F. E. Hansen, Gen. Mgr.

Helen Twelvetrees & Zane Gray Now in Sydney

Dangar, Gedye & Co., Ltd.
Malloch House, 10-14 Young Street,
Sydney, Australia
Newcastle Branch: 351 Hunter Street
Kelvinator
7th January, 1936.

Mr. Taubeneck:

I am in receipt of your communication, having received one both through my firm and through my private address, and am very pleased to note that you will be calling on us in the very near future.

No doubt you have received my previous communication which I forwarded to you immediately I read, through your paper, that you proposed making a tour of Australia and can only extend you a cordial invitation to look us up while in Sydney.

Without knowing the time you will have at your disposal to spend in Australia, it is rather difficult for me to suggest all the places you should look up. No doubt Sydney will be your first port of call, this being the home of quite a number of Refrigerator Manufacturers in this country, and there are a number of places of sightseeing interest which you should not miss, and if we can be of any assistance in arranging anything in this country, please do not hesitate to let us know.

In the first place, one of the greatest attractions for American visitors is the Koala Bear Farm, which by the way is Kelvinator equipped.

Some very interesting and picturesque drives can be had within a short distance of Sydney, perhaps the best of these being the Jenolan Caves, Bulli Pass, and Hawkesbury River.

From the number of prominent American Visitors we are receiving in Australia at the present time, it would appear that quite an amount of interest is being taken in this country by your own people.

At the present time we have Miss Helen Twelvetrees nere making a picture; Zane Gray arrived this week, and is to be followed by another American actor to make pictures in this country.

From a refrigeration point of view you will no doubt be surprised at the growth in this industry over the last two or three years, local manufacturers being very prominent in the field at the present time.

Quite a number of the refrigeration factories are situated in Sydney, the biggest of these being the Electricity Meter Manufacturing Co. Ltd., who hold the franchise for the manufacture of "Leonard" cabinets.

Passing on to Melbourne which is some 600 miles south of Sydney. This is also quite a manufacturing centre, as is South Australia, Adelaide, the capital of South Australia, being the home of Kelvinator Australia Limited, a local company which has been promoted for the assembling of Kelvinator commercial and domestic machines.

While never having visited Western Australia, I understand that refrigeration in that state is not as prominent as in the Eastern States.

Queensland, some 600 miles to the North, offers quite a large scope for refrigeration owing to their tropical climate. They also have a number of scenic attractions, the greatest of these being the Great Barrier Reef.

From the sporting point of view you will find that all tastes are catered for in this country, although as it would appear that your arrival here would be towards the latter end of our summer, some of the out-of-door sports will of course be curtailed.

However, there are ample golf facilities in this country, and as most of our golf is played in the winter time, you should not miss an opportunity of playing on some of our links.

However, as previously stated, if we can be of any assistance whatsoever in escorting you on any of these trips and making any reservations, do not hesitate to let us know, and we will endeavour in some measure, to reciprocate the kindness shown to the writer while in Detroit.

E. Ebeling.

Arriving at the Right Time

Refrigeration Supplies Company
Engineers—Importers—Contractors
301 Castlereagh St.
Sydney, Australia
January 7, 1936.

Mr. Taubeneck:

Your desire to visit our land has reached us in the form of your letter dated November 25, for which we extend our thanks.

You are well known to the undersigned through the medium of your valuable paper. You have done a lot for refrigeration, and you deserve a king's welcome.

I think your world tour is a great idea, and although there is only a handful of people in our scattered land, compared with the millions in your United States, still there is quite a deal to see here in the refrigeration field, as we have manufacturers making units from ⅛ H.P. up to 200 H.P.

We happen to be the representatives here for Penn Electric Switch Co., American Injector Co., Allen Bradley Co., Automatic Products Co., Rocke International Electric Corp., Humidi-Cooler Corp., Riley Engineering Corp., Fee & Stemwedel, Inc., as well as prominent English manufacturers, and with these lines, we obviously have something to say in the industry here.

We are in a position to show you things which you should see, and maybe some things, which as a newspaper man, you should not see. I suggest that you try and time your arrival here at the end of February or beginning of March, which is the best time from the weather and refrigeration points of view.

My car has enough room to carry you around, and the use of my private office would be at your disposal.

If you could advise us as to the steamer you are traveling on, and the date of its departure, we would surely appreciate it, and if you could send us a photograph of yourself, one of our officials could be at the wharf to meet you, and see you through the customs paraphernalia.

With our very cordial welcome to you.

Benjamin B. Maye.
General Manager.

Will Meet You at the Boat

Electricity Meter Mfg. Co., Ltd.
Joynton Avenue, Waterloo
Sydney, Australia
7th January, 1936.

Mr. Taubeneck:

I have your letter of November 25th and really am delighted to know that you are likely to include Australia in your around the world itinerary.

If you will let me know when you expect to be arriving in Sydney I would like to meet you at the boat and see that you get in touch with all the people in the trade whom you should meet. My company, as leading manufacturers in this country, will also be very pleased to show you every courtesy on your arrival.

With regard to the other suggestions as to where you should go and whom you should meet, this will be the subject of a longer letter which I propose to write almost immediately, but this is brief so as to catch the "Mariposa" leaving tomorrow.

A. A. McCullagh,
Factory Rep. Refrig. Section.

Refrigeration Market Most Active in N. S. Wales

Australian General Electric, Limited
93-95 Clarence Street
Sydney, Australia
Works: Auburn, N.S.W.
Richmond, Victoria
Representing
Associated Electrical Industries, Ltd.
British Thomson-Houston Co., Ltd.
Edison Swan Electric Co., Ltd.
Ferguson Pailin, Ltd.
International General Electric Co.
Metropolitan-Vickers Electrical Co.
7th January, 1936.

Mr. Taubeneck:

We are in receipt of your letter of the 25th November, 1935, indicating your proposal to undertake a world trip during this year, and we should like to take this opportunity of advising that we will look forward with pleasure to seeing you when you visit Australia, and you may rest assured that any assistance which we can extend to you will be gladly given.

You will, we assume, be visiting all States during your stay, and as we have offices in each state you can look forward to every assistance from us. As the greatest development in electric refrigeration has taken place in this state, by virtue of its size, compared with other states, it is assumed that you will make Sydney your first port of call, as by so doing you will be able to get in touch with the various manufacturers of electric refrigeration equipment in which you will of course be most interested. Also as most of the head offices of the importing houses are in Sydney it will undoubtedly be the most satisfactory starting off point for such a trip as you contemplate.

J. K. Lancaster,
Manager, Refrigeration Dept.

A Large Continent

Electricity Meter & Allied
Industries, Ltd.
Joynton Avenue, Waterloo,
Sydney, Australia
3rd January, 1936.

Mr. Taubeneck:

I was pleased to receive your letter of November 25th addressed to New System Telephones Pty., Ltd., one of our subsidiary companies, and to learn that we may hope to be soon welcoming you to this country.

We have already heard of your contemplated visit from our mutual friends, F. C. Lovelock, Ltd., and we are all looking forward to seeing you. You can rest assured that we will do all we can to make your visit a pleasurable one.

As you know, Australia is a large continent, and as your time, no doubt, will be limited, we cannot expect that you will be able to visit all our states, maybe having to be content with a visit to Sydney and Melbourne, and possibly Adelaide, where you will be able to meet a great number of those engaged in our industry.

We will watch with interest advices of your movements and will arrange not only to have a talk with you over refrigeration topics, but also, we hope, be able to show you something of our country and for you to meet some of its people.

With very best wishes,

J. I. Carroll, General Manager.

Want American Franchise

N.V. Carl Schlieper
Handel-Maatschappij
Batavia, Bandoeng, Palembang, Padang, Pontianak, Semarang, Tegal, Djocja, Solo, Soerabaia, Makassar, Menado, Medan, and Singapore.
Telegrammen—Havauweltevreden
Batavia-C
Jan. 17th, 1936.

Editor:

With great interest we have learned of your intention to visit also our country on your next world tour. In connection with your inquiry to give some suggestions regarding the towns to visit, etc., the following might interest you.

Our head office is in Batavia with branch-offices in all towns according to the enclosed list. Besides we have agents in many smaller towns, so that our sales-organization reaches the whole of Java, Sumatra, Borneo, Celebes, and the isles East of Java including N.W. Guinea. To our opinion, however, for a survey of the market it will be sufficient, if you only visit Batavia or perhaps Batavia and Sourabays, both with their environs of course.

With regard to refrigerators, we are representatives of the Electrolux Works of Sweden and England and sell chiefly oil operating refrigerators. The sale of electric refrigerators such as General Electric, Frigidaire, Westinghouse, Kelvinator, Norge, and Leonard, are in the hands of other importers. We do have the intention to take up the sale of household electric refrigerators of American manufacture. Perhaps you can bring us into connection with leading manufacturers of such refrigerators, others than the above mentioned.

For your information it may serve to mention, that we represent here in this country several leading American manufacturers, e.g., E. I. du Pont de Nemours & Co., Parlin and Newburgh, Sullivan, California Corrugated Culvert Co., B. F. Goodrich Rubber Co., Akron (U.S.A.), etc.

In case you realize your intentions, we shall be glad to furnish you further information.

N.V. Carl Schlieper Handel Mij.,
Director.

How to See the Malays

General Electric Co., Ltd.
Mfrs. of Everything Electrical
Magnet House, 12 Battery Road,
Singapore, Straits Settlements
London Office: Magnet House,
Kingsway, London, W.C. 2
8th January, 1936.

Imperial Air Mail
The Editor:

We would refer you to your letter of November 27th with regard to Mr. Taubeneck's visit to Malaya and we shall be very pleased to see him on his arrival in Singapore.

It is difficult at this stage to give any definite programme to be carried out in this country but from your point of view the visit could be done by going to four main towns only.

Starting from the south in Singapore up to Kuala Lumpur in the centre of Malaya and then further north to Ipoh and on to Penang, the distance from Singapore to Penang being 500 miles and it can be done in 24 hours by means of our exceedingly rapid Government Railways.

Alternatively, of course the same trip can be carried out by car as the roads are very good.

We presume that you will arrive here from China and then you can go on through to India from Penang, on the other hand, it is possible you may break your visit at Singapore and go over to Java.

We would further state that if you are on a rush visit you can go by air from Singapore to Java and also from Singapore to India via Bangkok and Rangoon.

You can also of course go by train from Singapore direct through to Bangkok which takes about 56 hours.

As regards your stay at Kuala Lumpur, Ipoh and Penang, I think that you will find one day quite sufficient in each place as Singapore is the main town in the country and in most cases the Head Offices of all firms are situated here.

We hope that this information will be of assistance to you and awaiting your arrival with interest.

E. S. Hebditch,
Mgr. Engineering Dept.

Arthur Boyd Transferred From Bombay to Sydney

Frigidaire Limited
General Motors Building,
Broadway at 57th St., New York, N. Y.
In care of Frigidaire, Ltd.
The Hyde, Hendon, London

Mr. Taubeneck:

Your letter of November 26th last, sent to me in Bombay has been forwarded to me here.

I am now on my way to New York, where I expect to arrive about the middle of February and may possibly have an opportunity of visiting you in Detroit.

According to present arrangements, I am leaving India for good and proceeding to Australia, so that I will unfortunately not be able to meet you in India. I am, however, turning your letter over to Mr. R. Weaver who has gone to India in my place and whom I have asked to get in touch with you as soon as possible. As a general outline and in view of the fact that your time is going to be very limited, Rangoon, Calcutta, Madras, and Bombay, are about the only places that you will be able to visit. These few places will absorb approximately five weeks if you are to get any real value from your visit. I believe you have our Distributors' addresses in those places and I know they will be only too glad to see you. Apart from our folks there are of course the other principal American refrigeration manufacturers representatives to be seen, so that your time would be very fully occupied.

Wishing you every success on your trip, which should be invaluable to your paper and its readers.

Arthur Boyd.

P.S. Mr. Weaver's address in India will be the same as mine was.

Invitations from India

Refrigerators (India) Ltd.
Refrigeration Engineers
62 Hazra Rd., Calcutta
Showroom & Service Depot, 24 B. Park St.
Telegrams: "Icycold"
Manufacturers and Designers of Show Cases, Bottle Coolers, Counters, Water Coolers, Ice Makers, Ice-Cream Plants, Cold Storage Rooms, Mortuary Coolers, Milk Coolers, Room Coolers, etc. Also Air Conditioning For Every Purpose.
2nd January, 1936.

Mr. Taubeneck:

We are glad to receive your letter dated Nov. 29, 1935, and will be pleased to see you and give you all the information and assistance we can.

Kendall, Director.

Air Conditioning Corp., Ltd.
(Engineers and Contractors)
8 Esplanade Mansions, Calcutta
Telegrams: "Thermostat"
Dec. 30, 1935.

Editor:

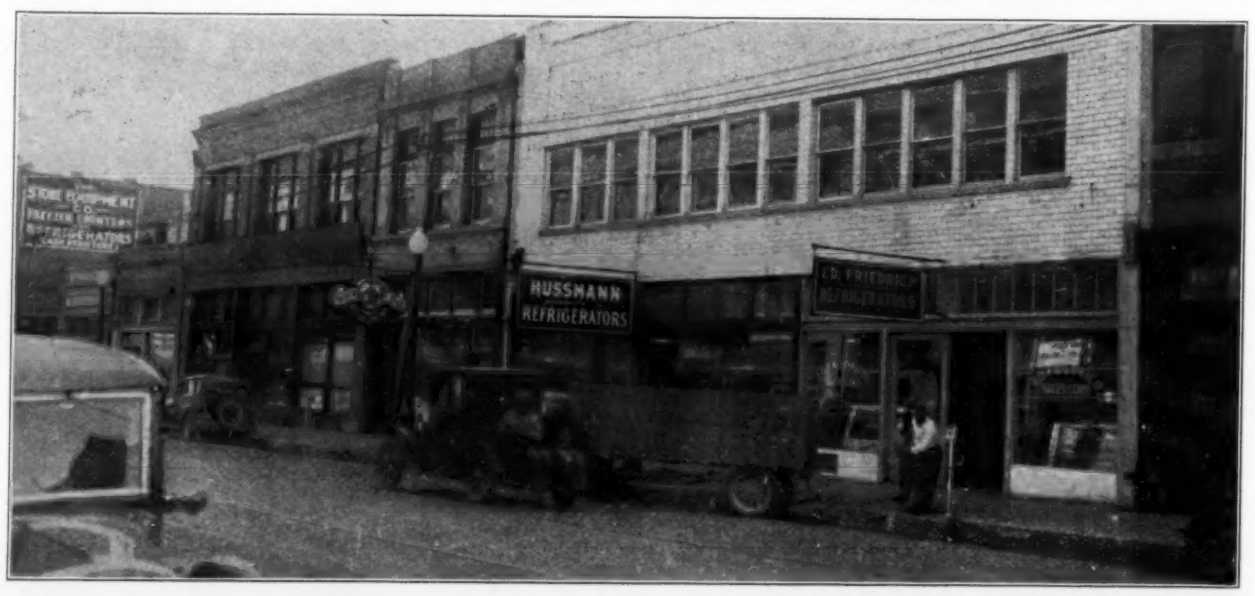
We acknowledge, with thanks, receipt of your letter dated Nov. 29, 1935, and will be glad to render you what assistance we can if you propose including either Calcutta or Delhi in your proposed forthcoming tour of the East.

You can communicate with us in Calcutta at the above address, or at The Exchange, Alipur Rd., Delhi, whichever is most convenient to you.

C. R. Hooper, Managing Director.

Refrigeration Row in Dallas

There Are Seven Refrigeration Sales Offices Located in One Block in Dallas, Texas



Air Conditioning

Attendance and Interest Shown At Exposition Are Evidence of Air-Conditioning Progress

(*Continued from Page 1, Column 4*)

those who saw the showing during the daytime and who either had to have an invitation or who had to register and give a definite reason for wanting to see the show. The public was not allowed in until after 8:30 p. m. Estimates of public attendance range from 40,000 to 80,000.

But it wasn't the mere numbers of those attending that encouraged the exhibitors, it was the avid interest and knowledge displayed by the daytime visitors. Said John Garceau, director of Kelvinator's air-conditioning advertising:

"Never before at a show like this have I met up with people who expressed so great an interest, or who could discuss the problems of the business so intelligently.

"They showed more than a passing interest; they stuck around and asked a great many technical questions, some of which were real 'stumpers.'

"These daytime visitors came from all types of businesses—some were heating contractors, a number of them were refrigeration service men, many were dealers in major electrical appliances. Almost all of them expressed an intention of getting into air conditioning some day, and therefore they wanted to learn everything possible about it."

K. B. Thorndike of Detroit Lubricator Co. had about the same reaction to the attitude of the legitimate visitors as Mr. Garceau.

"We were impressed by the serious, intelligent conversation of those visitors who had a real interest in the exhibits," said Mr. Thorndike. "The two types of visitors whom we noticed most were the top engineers and other key executives of the leading air-conditioning manufacturers, and refrigeration service and installation men."

Since Detroit Lubricator exhibited control devices for both heating and cooling systems, they were somewhat in a position to determine in which phase of air conditioning the visitors were most interested—the heating or cooling function.

According to Mr. Thorndike, a check-up among the personnel in charge of the exhibit elicited a feeling that the predominating interest had been in devices used in the cooling function.

This greater interest in "comfort cooling" than in any other phase of air conditioning was manifest throughout the show, with the exhibits having equipment doing actual cooling drawing the greatest share of attention, and most questions being asked about the cooling problem.

One trend very much in evidence during the show was the efforts made by certain exhibitors, particularly those with central system conditioners that had no cooling, to point out that cooling was either too expensive, or not far enough advanced, to be considered for the average present-day installation, particularly in the home.

Some of the estimates on the cost of cooling and operating a cooling system as given by these exhibitors were so far out of line as to be ridiculous.

Noteworthy, also, was the indiscriminate use of the term "air conditioning" for all types and varieties of equipment which by no stretch of the imagination could perform real air-conditioning functions.

As Chief Engineer Joe Askin of Fedders Mfg. Co. put it: "They ought to take down the 'air-conditioning' sign from half of the exhibits."

Following is a brief resume of the exhibits at the Exposition which would be of interest to readers of ELECTRIC REFRIGERATION NEWS. The exhibits are covered in alphabetical order:

Aeriet (Bendix)

Making its bow at the show was the line of air-conditioning equipment made by the Aeriet Air Conditioner Co., a subsidiary of Automatic Products Corp., which in turn is controlled by Bendix Corp., all of which means that Bendix has made its long-rumored entrance into the air-conditioning field.

All the Aeriet units that use refrigeration employ Thermal Units compressors, which gives some substance to the rumor that the Bendix air-conditioning manufacturing subsidiary has an interest in the Thermal Units Co.

The Aeriet line features the following types of conditioners:

A self-contained "window unit" room cooler, which has an air-cooled compressor and which sits on the sill of double-hung windows, and can be plugged into an ordinary electrical outlet. A bellows seal is provided against the window casing and sill.

Ceiling-type units of ornamental design (which can be combined with a lighting fixture) which draws the air up into a cooling chamber and circulates it on a 360° plane. These operate with remote installation of the compressor, of course.

Year-'round floor-type conditioners, which can be had in either self-contained or remote compressor installations.

Feature of the self-contained floor-type models is that the compressor and the blower fan are both operated from the same motor. Units are available in capacities from ½ to 5 tons.

Air Controls, Inc.

Blower-filter units for forced-air heating and air conditioning, air circulators, and blowers for air-conditioning systems were displayed in the booth which Air Controls, Inc., Cleveland, maintained at the Exposition.

Aire-Rite Corp.

A cabinet-type unit for year-'round air conditioning was introduced at the Exposition by a concern new in the field, Aire-Rite Corp., Chicago.

The unit, it is claimed, performs all essentials of year-'round conditioning —temperature control, washing, humidification, dehumidification, cooling, and circulation, and is also said to incorporate methods of deodorizing and disinfecting the air.

Grille is located at the side of the unit. Specification details were not available during the Exposition, but will be announced soon.

Alco Valve

Leading Alco Valve Co.'s display at the Exposition were the recently introduced Alco "sextuplets," a new series of thermo valves. An illuminated cabinet, with magnetic valves arranged for operation, showed off the new valves to best advantage.

Also displayed by the company were its regular lines of automatic refrigeration control valves for air conditioning and product cooling.

American Blower

Air conditioners, unit heaters, and furnace fans featured the exhibit of American Blower Corp. Main interest centered around the company's newest product, a unit heater, the Venturafin, the first unit heater to have complete decibel ratings.

American Radiator

Looking like a composite of most of the rest of the exhibits put together, American Radiator's booth contained equipment relating to practically all phases of air conditioning. These included air conditioners of various types, room coolers, filters, convectors, oil-burning boiler, radiators, and Arco pipe and fittings. Parts of the display had equipment in actual operation for the edification of the visitors.

Armstrong Cork

Corkboard insulation for walls, roofs, and air ducts, as well as cork covering for the insulation of cold lines, was exhibited by Armstrong Cork Co. in its booth at the Exposition.

Samples of the company's Temlock, Vibracork, and insulating brick were also displayed, in a setting constructed entirely of corkboard.

Automatic Products

Automatic controls for air conditioning, commercial refrigeration, and heating, including expansion valves, solenoid valves, thermostats, humidity regulators, draft regulators, and constant level oil valves were shown at the Exposition by Automatic Products Co., Milwaukee.

Baker Ice Machine Co.

Burge Ice Machine Co., central sales distributor with headquarters in Chicago, was in charge of Baker's booth at the Exposition.

Shown were a large four-cylinder Freon compressor unit, manufactured by Baker, a cabinet-type room conditioning unit for homes, offices, and commercial use, and a suspended-type cooling unit.

Barber-Colman

A high power valve operator, made for either high or low voltage operation, and a new oil-immersed damper-control motor, rated at 1,000 lb.-in. torque, were features of the Barber-Colman Co.'s display.

The company had a complete layout of electric temperature and humidity controls, grilles and registers, and air-conditioning controls for complete control of temperature, moisture content, direction, diffusion, and aspiration of air also on exhibit at the show.

Bryant

Gas-fired air-conditioning equipment of several different types was to be seen in the Bryant Heater Co. display.

Among the equipment shown was the Bryant year-'round conditioner, in which gas is employed for both the heating and cooling functions; the Bryant Dualator, a year-'round conditioner in which cold water is used for cooling and which is obtainable in various models priced from $360 to $690; and the Bryant gas-fired humidifier, with an evaporating capacity of 1.1 gallons per hour, which lists at $195.

Buffalo Forge

Several examples of the heating and ventilating equipment which it manufactures were shown by Buffalo Forge Co. at the Exposition.

Included were a No. 3¼ "limit-load" conodial fan, mounted on a latest type silent floating base; a No. 151 HVA fan for domestic heating and air-conditioning systems; a No. 122 "PC" cabinet, equipped with cooling and heating coils; a "Breezo-Fin" unit heater; a gas unit heater; an inverted "lowboy" unit heater; a Buffalo type "A" air washer; and a No. 3 "Baby" conodial fan.

Carbondale

Various models in the new 1936 line of Carbondale condensing units, which have a range of from ¼ hp. to 25 hp., were on display.

One of the units was hooked-up to and operating a central, "package-type" air conditioner, demonstrating the manner in which the cooling function was obtained.

Carrier

Carrier's part in the Exposition was primarily a pictorial one. Not a piece of equipment was displayed in the double booth which the company maintained at the show.

Walls of the exhibit, however, were lined with posters showing large photographs of air-conditioning equipment, refrigeration compressors, unit heaters, and interesting installations of such equipment in homes, restaurants, offices, office buildings, stores, theaters, hotels, and plants throughout the world.

Century Electric

The recently-introduced line of Century single-phase, repulsion-induction, fractional horsepower motors was the leading feature of that company's display. Polyphase motors, both a.c. and d.c., were also displayed in the booth.

Light and mirrors were utilized to show the differences in vibration between a balanced and unbalanced motor. The mirrors reflected the vibrations of the motors on a screen, where they could be easily compared.

Chase Brass & Copper

Chase showed a variety of copper tubing and fittings for use in air conditioning, with a special part of its booth devoted to an exposition of the various stages through which copper goes in the manufacture of condensers for electric refrigeration units.

Commonwealth Edison Co.

As a promotional venture in the air-conditioning field, Commonwealth Edison Co. distributed pamphlets showing the value of air conditioning as a paying investment for offices, restaurants, beauty parlors, stores, funeral parlors, and homes to persons who visited its booth at the Exposition.

The booklet, primarily a picture piece, contained photographs of typical installations in offices, stores, hospitals, funeral chapels, restaurants, and residences in and near Chicago, together with small diagrams showing installation features of floor, suspended, and duct-type units.

Services of Commonwealth Edison Co.'s engineers were offered interested prospects to assist in planning installations and suggesting types of equipment best suited to individual needs.

Cook Electric

Featured by Cook Electric Co. was a zone control system for air-conditioning systems. This works through the medium of thermostats, placed in one of the rooms of each zone, which motivate dampers installed on the duct for each zone.

Dayton Rubber

An extensive line of V-belt drives designed for use with refrigerating and air-conditioning machinery was shown by Dayton Rubber Mfg. Co. In addition, belts manufactured by the company were in use on much of the machinery in operation during the Exposition.

De La Vergne

Several models of its air conditioners were shown by De La Vergne Engine Co., newest of which is a self-contained unit, working on the reverse refrigeration principle, that both cools and heats, and requires no piping or other building alterations for installation.

The unit is compact, taking up little more floor space than an ordinary radiator. For winter use, where the heating requirements exceed the capacity of the unit itself working on a reverse refrigeration cycle, a heating coil may be provided inside of

(*Continued on Page 8, Column 1*)

Delco motors

The reputation of any household appliance depends largely on the reliability of the motor which operates it. Delco motors, with years of dependable service to their credit, are known to prospective buyers for their efficient and quiet operation. And as a result, the men who sell Delco-powered appliances meet with no sales resistance—for buyers feel certain that a Delco-equipped product will surely give them the trouble-free service they want. That is why appliance manufacturers choose Delco motors, and why experienced dealers prefer to sell products that are equipped with Delco motors.

Made in Canada by McKinnon Industries, Ltd., St. Catharines, Ontario

DELCO PRODUCTS CORPORATION • DAYTON, OHIO

Air Conditioning

Many New Developments in Conditioning Displayed at International Show

(*Continued from Page 7, Column 5*)

the unit, which may be attached either to the steam or hot water system.

A simple turn of a lever throws the unit from cooling to heating; and, since it is air-cooled, no water or waste connections are necessary.

Refrigerating capacity of the unit is 14,000 B.t.u.'s per hour, equal to melting 1⅙ tons of ice in 24 hours. The unit circulates 400 c.f.m. of air, about 20 per cent of which is outside air for ventilation. Installation requires only a duct passing over the window sill under a raised sash, or some other means of access to outside air, and connection to electric power. No piping of refrigerant or connection to water main is needed.

Compressor is sealed, and Freon is used as the refrigerant. The compressor is two-cylinder vertical shaft type, direct-connected to a 1½-hp. motor.

Delco-Frigidaire

Exhibiting for the first time at any place under the new name, the two recently-merged air-conditioning divisions employed two exhibits to put before the visitors a wide variety of air-conditioning and comfort-cooling equipment.

Included in the exhibit were floor-type room coolers, suspended-type coolers, complete year-'round central systems, store conditioners, and model layouts for home systems.

Prominently displayed in one of the exhibits was a full-size operating model of the Frigidaire "balanced" valve arrangement for condensing units used in serving a number of conditioners.

This consists of a crankcase pressure-regulating valve, which maintains normal loading on motors under rising load conditions; and an evaporator pressure-regulating valve which maintains proper evaporator temperatures under diminishing load conditions.

Detroit Lubricator

Mechanical and electrical controls for refrigeration and air-conditioning equipment, oil burners, gas burners, and stokers were shown by this company. Featured in the exhibit was a new thermostat, and expansion valves for refrigeration systems, particularly those used for air conditioning.

Electrimatic

Pressure, temperature, and electrically operated valves, water regulators, refrigerant control, and regulating valves, and safety blow-off valves for refrigerant and steam systems were displayed at the Exposition by Electrimatic Corp., Chicago.

Emerson

Motors, exhaust fans, ventilating fans, furnace blowers, furnace fans, and air circulators were exhibited by Emerson Electric Mfg. Co., St. Louis. The air circulators are available in 24- and 30-in. models with four styles of mountings. Air deliveries range from 7,000 to 10,000 c.f.m.

Fairbanks-Morse

A complete line of Ortho-Clime air-conditioning units for both summer and year-'round use was shown by Fairbanks, Morse & Co. The company also had on display a line of its automatic coal burners.

Air conditioner models displayed included:

Model 612, a floor unit for year-'round use, with a cooling effect of 1 ton, using water or Freon as the refrigerant, and steam or hot water for heating.

Model 836, a wall unit for year-'round use, with more than 3 tons cooling effect, and using water, Freon, hot water, or steam.

Model 715, a ceiling unit for summer cooling and dehumidifying, with a cooling effect of 1 ton, with either water or Freon as the refrigerant.

Model 736, a year-'round ceiling unit, which may be used with air ducts. Cooling effect of the unit is more than 3 tons, and water or Freon, steam or hot water, may be used for cooling and heating.

Model 2412, a floor unit for year-'round use, with a cooling effect of 2 tons. Either cold water or Freon may be used for cooling, and steam or hot water for heating.

Also displayed was a F-M refrigeration compressor. These are available in two or four-cylinder models, from ½ to 100 hp.

The new Ortho-Clime units are of modernistic design, tastefully finished in ivory or cool green in the first three models. The fourth, model 2412, is finished in walnut effect, to blend with office or home furniture.

Fedders

Its new series of unit heaters, featuring innovations in design, was shown by the Fedders Mfg. Co.

Fedders also exhibited its "package" air-conditioning coils for cooling, and other parts of cooling systems which it manufactures.

Fox Furnace Co.

A summer air-conditioning unit, and three winter conditioners fired by gas, oil, and coal, were shown by Fox Furnace Co., Elyria, Ohio, a division of American Radiator & Standard Sanitary Corp.

The summer-conditioning unit was connected to a 3-hp. Universal Cooler condensing unit and evaporating coils, and was in operation during the show.

Newest product was the Sunbeam gas-fired winter conditioner, encased in a cabinet of heavy-weight cold-rolled furniture steel, and finished in a two-tone green color combination. The conditioner was equipped with "zone control," with temperature regulation by four thermostats.

Frick Co.

Central feature of Frick Co.'s display of refrigerating equipment designed for air-conditioning work was an enclosed-type Freon compressor, with two cylinders of 7¾-in. bore by 5-in. stroke. Cover plates were removed, and the machine was turned over slowly by a reduction gear motor, so that visitors could observe the action of the valves, lubricating system, and other parts.

Also shown in the exhibit was Frick's new 20-ton low-pressure overhead-drive refrigerating unit with its four cylinders arranged in V-pattern. The unit is driven by a 20-hp. overhead motor, and is one of a pair of machines with 4¼-in. cylinders just brought out by the company. The smaller machine has three cylinders, and is of 15-ton capacity.

Julien P. Friez & Sons, Inc.

A working exhibit of its instruments with which visitors, by pressing buttons, could humidify, dehumidify, heat, and cool a small glass chamber and see for themselves the response of the instruments, was a leading feature of the display booth which Julien P. Friez & Sons, Inc., had set up at the Exposition.

In addition to a complete range of humidistats, thermostats, combined humidistat-thermostats in single cases, electrical relays, relative humidity and temperature indicators, air meters, sling psychrometers and anemometers, portable and semi-permanent recording instruments, the company also displayed a long-distance transmission system for indicating or recording at some distant point relative humidity, dry-bulb temperature, etc.

Newest device shown by the company was the Windowstat, an instrument said to provide complete protection against window condensation during cold outdoor weather.

It has two main applications: first, as a supervisory control to limit the action of humidifiers; and second, as a control instrument to start and stop fans that blow over the windows or strip heaters placed below the windows, or as a means of removing condensation from store display windows and increasing visibility.

Furblo

Featured by the Furblo Co. was its central-type conditioner, which is distinguished by its spray chamber arrangement. Spray nozzles completely fill the chamber with a fine misty spray which cleans the air at all times, humidifies it in winter if warmed, and dehumidifies the air in the summer if the water is cooled. The water spray is directed upon the filter, keeping it saturated.

General Electric

Samples and display models of the various styles and types of G-E conditioning equipment were shown by the air-conditioning department of General Electric Co. Some of the display models were in operation to show how the equipment works.

Included in the exhibit were a central plant air conditioner, a portable, self-contained room cooler, a room air conditioner, a unit assembly air conditioner for duct installation, a suspended-type store cooler, a gas furnace, a night air-circulator, a 20-hp. condensing unit in G-E's line of compressors for air conditioning, and an oil furnace.

Greer College

Literature and information on the courses in air conditioning and refrigeration offered by Greer College were available in the exhibit which the school maintained at the Exposition. Literature outlined the course in air conditioning, and listed rates for both resident and combination home study and shop training courses. Officials of the school were in charge.

Henry Valve

Exhibited by Henry Valve was its complete line of valves and fittings for use in refrigeration systems that form a part of complete air-conditioning equipment.

Bendix Presents Conditioners

Story of New Line on Page 7

Holcomb & Hoke

A display of "Firetender" stokers for domestic furnaces was maintained at the Exposition by Holcomb & Hoke Mfg. Co., Indianapolis, and its Chicago distributor, Iroquois Coal Co. One of the stokers was in actual operation.

Howe Ice Machine Co.

A Freon condensing unit operating on a ceiling-type comfort-cooling unit, a 1-hp. condensing unit, air-cooling coils, and a complete line of compressor parts were features of the display which Howe Ice Machine Co., Chicago, had at the Exposition.

Ilg

All types of Ilg air-conditioning and fan and blower apparatus was on display in the Ilg Electric Ventilating Co. booth.

Attention-getter was the use of a small 6-in. desk fan to turn the 72-in. Ilg self-cooled motor propeller fan, which was mounted in a bracket. This was designed to demonstrate how well-balanced and easy running the propeller fans are.

Other equipment shown included a "Spot Kooler," floor and ceiling type cooling units, Ilg-Kold compressor, Ilgattic cooling and ventilating systems, blowers, and unit heaters.

Imperial Brass

Imperial Brass Mfg. Co. displayed welding equipment for use in the construction of air-conditioning systems, and a line of fittings.

Kelvinator

Air-conditioning, cooling, and heating equipment was exhibited by Kelvinator Corp. Among the apparatus shown were various types of room conditioners and cooling units, with glass fronts to show how models operate; central-type conditioners, suspended-type units, oil burners, condensing units in sizes up to 20 hp., with a cut-away model to show how the condensing unit operates; and a condensing unit with remote condenser.

New product shown was a self-contained room cooler, in two sizes of .34 and .56 tons of refrigeration capacity, respectively. These are low, floor-type cabinets, which perform cooling and dehumidification, filtering and circulation.

Blower is on the top, with discharge through grilled opening in the side of the unit.

King Ventilating Co.

In a small booth, King Ventilating Co. showed models of the line of unit coolers which it manufactures, and literature on its complete line of air conditioners and humidifiers. Industrial sales division of the company is located in Chicago, and factory and general offices in Owatonna, Minn.

Unit coolers are manufactured in four models, ranging from 35 to 106 sq. ft. surface area, and with air volumes of from 525 to 1,600 c.f.m.

The King air conditioner is avail-

(*Concluded on Page 9, Column 1*)

The Stainless Steel Thermostat

RANCO Was the FIRST

—to build small, compact thermostats, specifically designed for domestic refrigerator service, on a quantity production basis.

Ranco led the way—in standardizing controls for all makes of refrigerators. Ranco proved that a PRECISION instrument—of outstanding dependability—could be sold at prices comparable with the prices of other production-basis units used in electric refrigerators.

Ranco has never relinquished its leadership! RANCOSTAT, The Stainless Steel Thermostat, is, beyond question, the finest control unit ever built for domestic electric refrigerators!

Valuable new Rancostat bulletin—yours for the asking.

THE AUTOMATIC RECLOSING CIRCUIT BREAKER CO., Columbus, Ohio

RANCOSTAT

Low Cost REFRIGERATION for MEAT MARKETS

★COPELAND★ Commercial REFRIGERATION

THOUSANDS of Copeland units are supplying low-cost refrigeration for meat markets and many other applications. These owners, whose **Copeland equipment has given up to 15 years actual service,** are proof of the rapidly growing demand for Copeland's superior performance. Every unit we build must meet the most exacting manufacturing standards. That is why these units prove to be so reliable. If you sell commercial refrigeration, you will do well to consider this great line. A few territories are available. Write.

COPELAND REFRIGERATION CORPORATION
Manufacturers of a complete line of Household and Commercial Refrigeration
Holden Ave. at Lincoln . . . DETROIT, MICH.

Copeland DEPENDABLE Electric REFRIGERATION

250 Manufacturers Exhibit Products at Air-Conditioning Exposition

(*Concluded from Page 8, Column 5*)

able in six sizes, ranging from 1½ to 12-tons refrigerating capacity, with cabinet or duct system optional. The units perform year-'round conditioning functions, heating, cooling, humidifying, filtering, washing, circulating, and dehumidifying the air.

Jas. P. Marsh Corp.

Another display in which visitors could operate the system of temperature regulation in a model of a miniature building and heating plant, and see for themselves the manner in which the control operates with varying outside weather conditions, was that of Jas. P. Marsh Corp., Chicago.

The complete line of the company's instruments, including pressure gauges, vacuum gauges, altitude gauges, compound gauges, ammonia gauges, hydraulic gauges, recording gauges, and dial and recording thermometers, was shown.

McCord

Two new products designed particularly for use in air-conditioning applications were exhibited by McCord Radiator & Mfg. Co. They were (1) a central-type conditioner, encased and complete with blower, for use with boiler-burner units or other type of warm-air heating systems; (2) suspension-type unit conditioners or "air-conditioning convectors," as McCord calls them, for use in stores, restaurants, and offices.

The central-type conditioner, which was making its first public appearance, is compact in size and nicely finished to fit in with the design and appearance of modern basements. Quiet operation and neat appearance are emphasized in unit coolers which range in price from $110 to $180.

Also shown were McCordFin blast heating and cooling surface for air-conditioning systems, constructed with new spirally wound finned tubes which are said to give substantial reductions in air resistance.

Minneapolis-Honeywell

The Exposition marked the first U. S. showing of Minneapolis-Honeywell's new exhibit background, which was built especially for showing its products—automatic controls for heating, ventilating, and air conditioning—at expositions which are national or international in scope.

Main theme of the entire exhibit was a miniature restaurant enclosed in glass that was heated, ventilated, and completely air conditioned. Standard M-H automatic controls regulated the temperature, humidity, etc., and could be changed by the spectator.

Recording controls on outside panels registered a complete record of changes in conditions within the glass-enclosed restaurant as and when they occurred.

Beneath the restaurant, also glass enclosed, was the various equipment used for air conditioning (including a ¼-hp. condensing unit), and same could be seen in actual operation.

The major part of this exhibit measured 30 ft. from end to end and was finished in a rich yellow and black color scheme with polished aluminum trimming.

A total of 5,000 watts of electricity was required to operate the exhibits, 250 incandescent lights, and 40 ft. of two-color Neon tubing.

Mueller Brass

A display of "Streamline" copper pipe and fittings for use in plumbing, heating, air conditioning, refrigeration, and other industrial applications, as well as refrigeration valves and fittings in both the flared and streamline types, was the center of Mueller Brass Co.'s exhibit.

Exhibits by Mueller licensees, using the company's patented soldered-type end in connection with valves, fittings, or other products, also occupied a prominent part of the booth at the Exposition.

Herman Nelson Corp.

In addition to its oil-burning, air-conditioning furnace unit, and its oil burner, which have been on the market for a number of years, Herman Nelson Corp., Moline, Ill., also showed a new product—a self-contained air-conditioning unit for summer cooling use.

Compact and attractive in design, the unit is enclosed in a streamline cabinet of steel, finished in cool green. No color options are available, purchasers being left to refinish the cabinets to their own tastes, if they desire.

Two circular grilles are on the top of the cabinet, and either may be opened or closed independent of the other. The conditioner is being manufactured at present in one model, a unit of ⅔ ton with a refrigerating capacity of 8,000 B.t.u. per hour, using a motor of ¾ hp. A rotary compressor is used, and Freon is the refrigerant.

Nesbitt

John J. Nesbitt, Inc., put most of the emphasis in its display on its heating surface with steam-distributing tubes. This consists of copper tube and fin heat transfer surface employing two steam-distributing tubes inside each of the regular condensing tubes, which is claimed to assure a uniform distribution of steam.

Central type warm-air heating and conditioning units were also shown.

Norge

The new Norge "Fine-Air" heating and conditioning system for homes in the price range of $5,000 to $50,000 occupied the central spot in the Norge exhibit.

The unit was in operation to demonstrate the forced-air circulation feature of the unit. Also shown in the booth were room coolers and Whirlator oil burners.

Owens-Illinois Glass

Dustop fibre glass air filters and glass wool insulation material for homes were shown by Owens-Illinois Glass Co. in its exhibit.

Steps in the development of the glass filters were shown in cases which lined the company's booth, and the back of the display was taken up by a dozen filters, lined up in typical "L" bank installation. A typical air-filter installation was exhibited in a glass-enclosed case in the front center of the booth.

Penn Electric Switch

Automatic controls for warm air, hot water, steam, vapor, and vacuum heating, refrigeration, and air-conditioning systems were shown by Penn Electric Switch Co., Des Moines. Newer devices manufactured by the company on display included a stoker control for furnaces.

Powers Regulator

Automatic temperature and humidity controls for heating, cooling, ventilating, and air-conditioning systems were shown by Powers Regulator Co., Chicago. Thermostats, diaphragm valves, and hygrostats were included in the exhibit.

Refrigeration & Air Conditioning Institute

Complete information on its correspondence courses in refrigeration and air conditioning was available at the exhibit which Refrigeration and Air Conditioning Institute had at the International Exposition. Officials of the school were in charge of the booth.

Refrigeration Appliances

Sharing the Baker-Burge booth was Refrigeration Appliances, Inc. Four of the firm's products were on display:

San-E-Fex, a floor-type, forced-draft air-conditioning unit of 1-ton capacity, designed for connection to a remote compressor, built on the principle of drawing air through the coils instead of blowing it, and adaptable for home, office, store, and restaurant use; Comf-E-Fex, a ceiling-suspended unit operating on the forced-draft principle, fully enclosed, with a capacity of 2 tons; Vert-E-Fex, a ceiling-suspended, down-draft meat cooler; and Air-E-Fex, a new cooling and dehumidifying coil for use with separate blowers and duct work.

Rega

Rega Mfg. Co. makes a humidifier with a self-cleaning spray nozzle. The cleaning pin in the nozzle is forced through the orifice every time the water is turned off. Humidifier comes complete with humidistat.

Reliance

In addition to a 30-ton refrigerating machine, the center-point of its exhibit, Reliance Sales Corp., sales division of Reliance Refrigerating Machine Co., also displayed its newest product, Reliance air conditioners, in both cabinet and wall models, for installation with a remote compressor.

These units are designed for summer or winter heating, and year-around humidity and air-movement control, although year-'round application is optional. Cabinet models are primarily for home use; wall models for commercial application. All models are of modernistic design, intended to add to the attractiveness of home, office, or store.

All-season models have a cooling coil, heating coil, humidifier, and two-speed squirrel-cage type blower fans. Summer operating models do not have heating coil or humidifier. Both cooling and heating coils are of the finned type.

All air is filtered, before reaching the coils. In summer, moisture is removed from the air by condensation, and the water removed is carried away by a drain pipe. In winter, moisture is added to the air, through the built-in humidifier, before it comes into contact with the heating coil.

Silent operation is claimed for the unit in summer operation, the only moving part being the direct-connected slow-speed fan and motor, said to displace a large volume of air without the usual swishing noise.

Three cabinet and four wall models are offered by the company, the only variation between them being in sizes and capacities. Copper coils are used for Freon; steel coils for brine. The air inlet has an adjustable intake, permitting introduction of a limited amount of outside air if desired.

Wall models are designed especially for shops or stores, and are adapted for recessing in shelving, partitions, or walls. Grilles are of the multi-directional flow type, and motor fan assembly has full floating power.

Timken Silent Automatic Co.

Air-conditioning oil furnaces, oil burners, and oil water heaters were displayed by Timken Silent Automatic Co. in its exhibit at the Exposition.

The oil furnaces provide complete winter air conditioning, plus summer ventilation. Burner, furnace, blower, filters, automatic humidifier, and automatic controls are all combined in a compact cabinet, finished in baked-on two-tone green enamel.

Vilter

Vilter Mfg. Co., Milwaukee, displayed an extensive line of its rotary compressors for refrigeration and air-conditioning use.

Walton

Walton humidifiers, manufactured by the American Gas Accumulator Co., were shown in actual operation, emitting a visible mist-like spray through small round holes in the dome of a container shaped like an urn.

Evaporating capacity of these humidifiers, when used in a room, is 1½ pints of water per hour. The container has a capacity of 2 gallons of water, and is finished in bronze. The device is equipped with an a.c., 115-volt motor. Price of the highboy model (with stand) is $45; of the lowboy or portable table model, $37.50.

When used in a central system the Walton humidifier has an evaporating capacity of 2 quarts per hour.

Westinghouse

Various types of air-conditioning apparatus, from the portable "Mobil-aire" room cooler to the 25-hp. compressor especially designed for air-conditioning applications, were in the Westinghouse Electric & Mfg. Co. booth.

Also shown were splash-proof motors, control equipment, and a model operating display of Westinghouse' new electrostatic air cleaner, designed to handle the cleaning function in air-conditioning systems. This was one of the devices which made its debut at the Exposition.

The electrostatic cleaner is so arranged that it draws particle-filled air past two small wires, suspended horizontally. Connected to a power pack, which raises their voltage, these wires "charge" all air particles in their vicinity. This act is termed ionizing the air.

Next the ionized particles are drawn through a series of plates which are also charged. The plates have opposite polarity, with the result that just as a needle jumps over to a magnet, so do these air particles move and cling to the plate.

In addition, a film of oil covers each plate to make certain that the particles, after being attracted, stick to the plates. After the aluminum plates fill up, they may be cleaned by simply running water over them.

The air, freed of particles, is then sent on into the room by means of a fan. The unit requires about 50 watts to operate.

Williams Oil-O-Matic

Featuring Williams Oil-O-Matic's display at the Exposition was one of the company's new Air-O-Matic air-conditioning systems in operation.

Other products on display included Oil-O-Matic oil burners, and water heaters.

The new line of Air-O-Matic products, using Zeon as the refrigerant, was described in the Jan. 1, 1936, issue of ELECTRIC REFRIGERATION NEWS.

Wilson & Co.

Demonstrated by Wilson & Co. was its air filter which utilizes Keratin fibre (processed animal hair) as the filtering media. The filter is of the throw-away type.

York

Center of York Ice Machinery Corp.'s exhibit was the York "Economizer," a new piece of equipment designed to reduce the water consumption of air-conditioning systems, and thereby serve two purposes: (1) save water costs for users of air conditioning, and (2) eliminate the possibility of water shortage, a question of increasing concern to city water authorities because of the recent advances in the use of air conditioning.

The Economizer is a combination forced-draft cooling tower and refrigerant condenser, manufactured on a mass production basis. It is arranged for either indoor or outdoor installation, being used indoors to bring in outside air and exhaust heated air.

A fan passes the outside air through a bank of bare pipe coils over which water trickles in a direction opposite to the air flow, giving a Baudelot cooling action. Refrigerant is condensed inside the coils, and flows to the liquid receiver in the base.

Cooling water is recirculated from the drain pan by a pump, driven by a fractional horsepower motor so small as virtually to eliminate the pumping charges usually encountered in a cooling tower installation. It is claimed that the Economizer, with a ⅛-hp. motor, will handle the same requirements as a conventional cooling tower with a 7½-hp. motor.

The continuous evaporation of water pumped over the coils is replenished automatically by a float valve. This make-up water amounts to about 1 per cent of the water required by an air-conditioning system. Engineering features of the Economizer are its low pumping cost, galvanized welded steel coils, low fan power requirements, and cleanibility of coils.

COROZONE... AIR CONDITIONING

Opens Up New Markets

No Other Line Offers All these Features

- Low price
- Portability
- Proven Performance
- Minimum Investment
- Attractive Appearance
- No Installation Worries
- Flexibility of Application
- Discounts that spell profit
- Freedom from "Engineering"
- Complete to meet every need

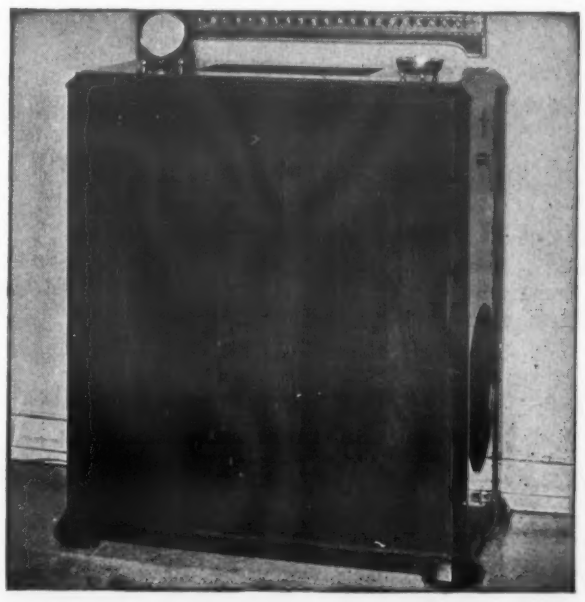
DISTRIBUTORS and Dealers long have been waiting for someone to announce a line of air conditioning equipment that could be *merchandised.* Something in package form... something that would not have to be "engineered"... something free from service and installation complexities... something lower in price... something, in short, with which the non-technical type of distributor could go out aggressively and confidently after his share of this 5 billion dollar market.

And now, after eight years of intensive study, research and development, such a line has been perfected, the product of Corozone, a pioneer of the air conditioning industry.

Now, Corozone makes it possible for *merchants,* as well as engineers, to enter the air conditioning field. And to do so with no heavy investment and with no added burden of overhead.

Now, Corozone brings air conditioning within the reach of countless new thousands. For with Corozone the user can acquire his equipment progressively, caring for most urgent needs first and expanding into a complete year-round system as rapidly as seasonal conditions require . . . or his capital permits.

Distributors and dealers are now being appointed. Why not learn more about Corozone's step-by-step air conditioning and its opportunities for profit? Write The Corozone Air Conditioning Corporation, Cleveland, for full information.



One of a number of attractive Corozone models. Easily portable. Plugs into electric outlet.

Corozone REG. U.S. TRADE MARK

The Corozone Air Conditioning Corp., 1422 Euclid Avenue Cleveland, Ohio

New York, 11 W. 42nd St. Philadelphia, 112 S. 16th St. Boston, 80 Boyleston St. Washington, 1710 H St., N.W.

ELECTRIC
REFRIGERATION NEWS

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Copyright, 1936, Business News Pub. Co.
Published Every Wednesday by
BUSINESS NEWS PUBLISHING CO.
5229 Cass Ave., Detroit, Mich.
Telephone Columbia 4242.
Cable Address: Cockrell—Detroit

Subscription Rates
U. S. and Possessions, Canada, and all countries in the Pan-American Postal Union: $3.00 per year; 2 years for $5.00. All other Countries: $5.00 per year.

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VOL. 17, NO. 6, SERIAL NO. 359
FEBRUARY 5, 1936

A Confused Prospect Pleads for Help

IN an adjoining column is a letter from a New Jersey working man who says he wants to buy an electric refrigerator, but who earnestly pleads for help in selecting "the best buy."

It seems obvious to us that this prospect is a victim of *poor salesmanship.* The fact that he has felt it necessary to ask advice from a *stranger* (to him) in a *distant city,* is sufficient evidence that something is wrong with the local situation.

From the statements made and the questions asked in his letter, it appears clear to us that several refrigerator salesmen in Riverside, N. J., have been devoting too much of their time to the profitless task of trying to keep each other from selling refrigerators.

Because we have long been imbued with the idea that the ownership of an electric refrigerator is highly desirable, we would really like to help this puzzled householder in his efforts to acquire a boon to health and happiness.

Unfortunately, there are several good and sufficient reasons why we cannot undertake to render the service requested.

It is true that we keep in close touch with all the manufacturers, that we report the detailed specifications of all models of all makes on the market, and that we are personally acquainted with most of the manufacturing executives, the leading distributors, and a large number of the dealers in all parts of the country.

It might seem reasonable, therefore, to assume that we should be able to give valuable assistance to prospective buyers of electric refrigerators. Following are some of the reasons why we should *not* do so.

In the first place, we do not operate a testing laboratory and we have no facilities for making scientific tests to determine the efficiency or reliability of the various types and makes of equipment on the market. We do not attempt to pass judgment on the relative merits of competitive makes. That is *not our job.* We simply report the news and let our readers draw their own conclusions.

In the second place, we are not prepared to offer a financial service, or advice to investors. We make no effort to keep a close check on the financial operations of the various companies, such as would be necessary to arrive at an authoritative opinion regarding the future success or failure of any particular manufacturer.

The *distributors* of electric refrigerators, who deal directly with the manufacturers do not ask us to protect them in their relations with the manufacturers because they are invariably men of wide business experience who rightfully consider themselves quite competent to handle their affairs.

The *dealers* who buy from the distributors usually do business with concerns in their own territory. Ordinarily, the dealer has had sufficient direct experience and acquaintanceship with the distributor to be able to depend upon him.

In the same manner we believe interests of the *ultimate buyer* are best served when he puts his faith in a *local dealer* whose reputation for good judgment justifies customer confidence.

Because it appears that the prospective buyer who wrote the inquiry published in this issue has been confused by incompetent salesmen, we sincerely wish that we were sufficiently well acquainted with the local situation to be able to recommend a dealer whose integrity is beyond question and who could be depended upon to assist him in selecting a suitable unit for his needs, at a price he can afford to pay. Under the circumstances we could offer him only one definite recommendation as follows:

"We would advise you *not* to put your faith in a salesman who devotes his time and effort to 'knocking' the product of some competitor. We offer you this suggestion because such a salesman is always a *poor salesman* and such tactics indicate that the man does not know his business."

"Quoted"

Taking Another Look at Price Maintenance

THERE has been a lot of new thinking on economic and marketing subjects in the past five or six years. Some accepted notions have been changed radically as a result of a more complete examination of the principles involved. For the first time an effort is being made to develop a sound philosophy of the machine age, with mass production and distribution working together toward the goal of lower prices and a wider and more equitable distribution of the wealth of a machine era.

The two principles upon which there has been general agreement are the necessity of sharing with the public the economies of mass production and distribution through constantly lower prices, and the maintenance of free competition as a means of insuring maximum efficiency in production and distribution.

The final and irrefutable argument against the regimentation of the NRA was its interference with competitive effort and with productive efficiency, by limiting and hampering production on the one hand and by attempting to freeze prices, on the other. A regimented industry, it was seen, could give more to the worker only by giving less to the consumer; whereas the ideal for an industrial democracy is providing more for both worker and consumer through greater efficiency in production and distribution.

Price maintenance, from manufacturers' standpoint, is a device to protect, through legal controls, the maker's product from being made a football of price-cutters, with consequent loss of trade good-will. From the standpoint of the large buyer it is a device to protect the less efficient distributor against the competition of the more efficient. From the standpoint of the small independent merchant it is a method of enabling him to make a profit on everything he sells, and of forcing his competitor to share that profit with him.

The weakness of the plan, in view of the new thinking which is being done on the whole subject of production and distribution, is that it is an artificial interference with free competition. The interests of the consumer are served best by insistence upon freedom of competitive effort, making itself felt in better products, better service, and lower prices. Legally established and maintained prices do not seem to be entirely consistent with that picture.

While many national advertisers have favored price maintenance by legal enactment, it should be noted that advertising is primarily a competitive weapon, of greatest usefulness in a situation of free and untrammeled competition.—*Advertising Age.*

Letters

This Isn't Our Job

Main St., R.F.D. No. 1, Box 393
Riverside, N. J.

Editor:

I was told that you edit a REFRIGERATION NEWS and that perhaps I can get some information from you in regards to different makes of electric refrigerators. I would like some information in regards to a Grunow refrigerator. I was told that they have discontinued making refrigerators and then again I was told that they were in process of reorganization. Is one or both of these reports true and how are the chances of them going on and doing business.

I was told perhaps you can give me the information about the different makes because you have a NEWS covering all makes. I want to buy one but I want to buy one that is not an orphan or going to be an orphan in a year or so. I am only a working man and in the last 5 years have lost an awful lot of time so you see I cannot afford to buy one that is not going to give me service or that after a year or so I cannot get parts for.

I think the Frigidaire, Kelvinator, Electrolux are out of my class. I don't think I can afford any of the above.

I would like to know though which would be the best buy according to mechanism, insulation, and price. Hotpoint, Norge, or Grunow in case they reorganize. Can you give me any information at all. I would greatly appreciate the same. It would not be worth my subscribing for the paper by the year as I am not a business man in that line. Hoping to hear from you at the earliest date possible. RALPH W. CHAMBERLAIN.

Answer: We regret to inform you we are not in a position to give you definite information of the kind you have requested. See editorial on this page.

Specifications Issues

"I have been watching each issue of ELECTRIC REFRIGERATION NEWS for some mention of the specifications issue (household). I have seen your ad quoting the specifications in small book form at $3.00 and I want to know if that is the only form in which you will release them this year."—W. R. Batten, 1808 N. University Ave., Peoria, Ill.

Answer: We will publish such data in ELECTRIC REFRIGERATION NEWS as rapidly as the information becomes available from manufacturers. For example, please note advance specifications on six makes published on page 20 of the Jan. 15 issue.

The new book on specifications to be issued in March will contain data on the 1936 models and *in addition* it will have similar information on all models of all makes manufactured during past years, insofar as the information is available from the files of ELECTRIC REFRIGERATION NEWS, or obtainable elsewhere.

There has been a demand for such a book on the part of service men and there have also been many calls for some kind of a "blue book" such as is used in the automobile industry for pricing trade-ins.

It is not our intention to undertake to establish trade-in allowance prices on old models in the 1936 book, but we are making a step in that direction by compiling the product information in one volume for the first time.

We have not yet made a definite decision regarding a "specifications issue" of ELECTRIC REFRIGERATION NEWS. We cannot tell at this time just when all of the manufacturers will be ready to report the information. We will endeavor to keep readers posted on the new models and furnish complete data in a convenient form. Whether or not it will be advisable to reprint all of the 1936 data in one or more issues of the NEWS (as was done last year) will depend upon circumstances.

Service Men Register for Catalog Mailing Service

Burbank Ice Machine Works
835 Main St., Burbank, Calif.

Editor:

I am a subscriber to your paper, ELECTRIC REFRIGERATION NEWS, and certainly enjoy reading it.

Kindly add my name to your list in your Catalog mailing service. This is a wonderful service, and I know it will be appreciated by service men.
OSCAR E. GILLE.

"I am a subscriber to the NEWS and would appreciate your adding my name to the mailing service list to receive catalogues. Thank you."—John Ehnot, 428 Division St., Perth Amboy, N. J.

"Please add my name to your mailing list. I am a subscriber to your paper."—John Gerrish, Jr., Box 217, Dixfield, Maine.

"I have been a subscriber to your magazine for the last few years and have found it very helpful to me. We would appreciate having a listing in the new mailing service catalogue. We are the largest independent service organization in central Wisconsin. Thanking you in advance."—Glen Reynolds (sales, service, installation), Portage, Wis.

"I see in the Dec. 11 issue that upon request you would add to your catalogue mailing service. I would like to request that you add my name to this list. I am receiving your paper and enjoy reading it very much. I am now getting catalogue of the Airo Supply Co., 408 N. Wells St., Chicago, Ill."—Ralph W. Peters, 431 E. Sandusky St., Findlay, Ohio.

"I am an independent service man and would greatly appreciate having you add my name to your catalog mailing list. I am a subscriber to the ELECTRIC REFRIGERATION NEWS and look forward each week for its arrival." Frank Cizek, 1754 Superior Blvd., Wyandotte, Mich.

"I am an independent service man and would like to be placed on the mailing list which you are forming. I am a subscriber to your paper.—Kermit Creamer, 90 West First St., London, Ont.

"Enclosed find check for $3 for a MASTER SERVICE MANUAL, would like to have you rush this to me as soon as possible. Will you please add my name to the catalogue mailing list you are now establishing?"—Stanley de Waal, Kenwood 4658—201 Rigsby Ave., San Antonio, Texas.

"Enclosed find money order for $5 for subscription of one year to ELECTRIC REFRIGERATION NEWS and MASTER SERVICE MANUAL.

"Also I want to be listed for service for use of manufacturers and put me on your mailing list.

"I think your ELECTRIC REFRIGERATION NEWS is great—lots of success in coming year—Charles Chevins, 119 No. Railroad Ave., Frackville, Pa.

"This letter is written you in appreciation for the many helpful hints and interesting news items which I have derived from your great little paper ELECTRIC REFRIGERATION NEWS.

"I would not be without it as I got the price of the subscription out of each issue and am asking you to please register my name in your catalog mailing and independent service men's list which you are forming."—H. A. Ward, Reliable Soda Fountain and Refrigeration Service Co., 1022 Maple Drive, Mason City, Iowa.

"The NEWS have been coming regular and for that I am thankful. I am an independent service man and would like to have my name put on the Catalog Mailing List if possible. Thanking you for past favors and for your great paper."—Alfred Woollven, Box 161, Hines, Ill.

"Please enter my name on the manufacturers mailing list for catalogues and literature which would be of interest to a service man. Your paper is very interesting and I look forward to its good news each week."—O. E. Huston, 2746 N. Third St., Cuyahoga Falls, Ohio.

"Kindly add my name to your Catalog Mailing Service. I am a regular reader of the NEWS and wouldn't be without it. Best regards."—L. J. McGee, (Radio and Refrigeration and Air Conditioning Service), R. No. 3, Winston-Salem, N. C.

"I am an independent service man and a constant reader of the REFRIGERATION NEWS. Will you kindly register my name on your catalogue mailing list?"—Truman T. Brooks, (Refrigeration Service), 1650 Markley St., Norristown, Pa.

"Please add my name to the catalogue mailing list."—Electric Refrigeration Service Co., Authorized Frigidaire Service, Louis T. Koehl, Harrisburg, Ill.

"I would like to be placed on your mailing list to receive catalogs and trade literature from manufacturers and supply houses."

"I think this is a very good service to render subscribers to ELECTRIC REFRIGERATION NEWS."—Guge Refrigeration Service, 3811 W. North Ave., Chicago, Ill. by Elmer Guge.

"Thank you so much for my copies of the NEWS. It is the first time I have seen your paper and I think it is a good help to us men who are trying to get along in the field of refrigeration.

"Now I see by your ad that the MASTER SERVICE MANUAL is offered in combination with the year's subscription. Now I did not know this till I received my papers so I am enclosing the extra two dollars. If this is not all right send manual and I will send another dollar.

"Will you please place my name on the mailing list for catalogue. Am independent service man."—James Hunt, 140 Carlton St., Toronto, Ontario, Canada.

Comment
By F. M. Cockrell

Amplion—Australasia, Ltd.

On Jan. 29, the day before George Taubeneck landed in Honolulu on his way to Australia, in came P. J. Manley, managing director of Amplion-Australasia, Ltd., 30 Clarence St., Sydney, who had just arrived from Australia and wanted to see the editor.

Mr. Manley was looking for information about manufacturers of refrigeration and air-conditioning equipment. I had just been telephoning the post office and the Leidich Travel Bureau trying to get authentic information on all ways and means of communicating with Australia. So Mr. Manley and I spent the afternoon *exchanging information* about refrigeration and Australia.

The next day we received a bunch of letters from Australian subscribers (published in this issue) which had arrived in Los Angeles Jan. 25 on the *S.S. Mariposa.*

The letters were immediately mailed back to George and should make connection with the Mariposa on its return trip, leaving San Francisco

P. J. MANLEY

Feb. 4, Los Angeles Feb. 5, arriving in Sydney Feb. 24.

George was scheduled to take the *S.S. Aorangi* out of Honolulu, Feb. 5, but soon after his arrival in Hawaii we received a cable message that he would defer his departure until Feb. 10 to take the Mariposa which arrives in Sydney only two days later than his original schedule.

The change will permit him to make a short stop at Pago Pago, Samoa, in addition to stops at Suva, Fiji Islands, and Auckland, New Zealand.

* * *

G. Washington Coffee

Returning to Mr. Manley's visit, he was much interested in my Electric Invisible Kitchen which I demonstrated by serving lunch in the office.

He claimed that he liked the G. Washington coffee and took along some samples, in individual tinfoil containers, to show to his wife (who is accompanying him on the trip). Of course, I should have served *tea,* although Mr. Manley says that the tea he gets in hotels over here is not up to the kind they have back home.

By the way, my wife discovered those individual tinfoil containers which the G. Washington coffee people furnish, as an answer to my bitter complaints about the coffee I had to drink when we were making automobile trips around the country.

Mr. Manley commented upon the three electric water coolers in the NEWS building (one Kelvinator, one Westinghouse, and one Halsey-Taylor) and remarked that Australians have not adopted this item of refrigeration equipment at all. Even the branch offices of large U. S. manufacturers do not have them.

* * *

High Price of Machinery

Looking over our shop, he watched the little machine which ties bundles of copies of the NEWS in the mailing room. It wraps a string twice around any size of package, cuts off the proper length and ties a knot. Mr. Manley heaved a sigh.

"You can have all of this machinery over here," he said, "because you can buy it so cheaply. In our country, everything of that kind costs *200 per cent more.* If you pay $300 for it, we would have to pay about $900."

Yet, in spite of the high prices, it appears that Australians find the money to buy large quantities of U. S. refrigeration equipment and many other products made in this country.

Carrier Plans for 1936 Presented

(Concluded from Page 1, Column 2)

with the introduction by President J. I. Lyle of Carrier's new general manager, L. R. Boulware, who outlined the company's sales policies for 1936.

The public today is the boss as to how any business will be operated, Mr. Boulware told his listeners.

"We may propose all we want to as to how a business is going to run, what we are going to make, how we are going to handle it, and it will be of no moment," he said. "The public will decree how business shall be run, what we shall make, what prices we shall charge, and in how pleasant a manner we will meet our trade. This attitude is always reflected through the channels of distribution. We must go to the public first, and work back from them."

Wampler and Price Speak

E. C. Wampler, vice president of Lawrence Stern & Co., Chicago, and a director and member of Carrier's executive committee, next outlined to the conference the national business picture as it appeared to him.

William H. Price, Jr., vice president and assistant sales manager, spoke on "1936 Selling Plans" in the absence, through illness, of Sales Director C. R. Lyle.

Chairman of the Board Willis H. Carrier, although absent on a foreign business trip, nevertheless was a speaker on the conference program, addressing members of the Carrier sales organization through the medium of a sound movie.

E. T. Murphy, vice president and district manager, spoke to the conference on the upturn in industrial business, and pointed out various productive fields in industry which are coming into the market for modernization with air-conditioning and refrigeration equipment.

E. P. Heckel, vice president attached to the Chicago Carrier office, next told the conference of some of the experiences he had undergone when the air-conditioning industry was still in its pioneering stages. Following him on the program were R. T. Tree of the New York City office, A. P. Shanklin of the Philadelphia office, and John F. Kooistra of the Los Angeles office, who told of sales tactics which they had successfully employed.

Brewster S. Beach, advertising manager, next outlined Carrier's advertising and promotional program for the year. He was followed by Donald French, vice president in charge of engineering, who introduced and explained the line of equipment which Carrier will have available in 1936.

Henderson on Program

First day's session was limited to the direct sales organization of the company. On the second day, a joint meeting was held with Carrier distributors and dealers from all parts of the country.

Featured at this meeting was an address by William B. Henderson, executive vice president of Air Conditioning Manufacturers Association, on "Stabilizing the Air-Conditioning Industry." M. E. Gillis of Commercial Investment Trust spoke on "Financing Jobs," and V. S. Day, director of dealer contact engineering, explained the new features and construction of Carrier's 1936 line.

A complete display of Carrier equipment was set up on one of the factory floors for inspection by those attending the convention.

Third day of the convention, a symposium of ideas relating to various field selling problems, featured several interesting addresses by Carrier dealers.

W. L. Walker of Schorer Co., Inc., Hartford, Conn., told of the application of product conditioning to farm cold-storage problems, with particular reference to fruits and vegetables.

Other dealer-speakers were J. E. Ulman, Air Conditioning, Inc., Baltimore; Harry L. Stevens, M. M. Stevens Co., Hutchinson, Kan.; M. E. Runner, Brown Johnston Co., Spokane; William Parkerson, Air Control Engineering Co., New Orleans; and H. T. Blocker, Blocker Air Conditioning Corp., Newark. J. M. Bickel, Carrier merchandising manager, presided at the session.

Afternoon session of this day was devoted to a talk on service and construction by J. H. Holton, newly-appointed manager of Carrier's consolidated service and construction department.

Balance of the conference was devoted to a series of technical sessions, covering standards, engineering, and construction features of equipment, sheet metal duct design, improvement in design and performance of Carrier refrigeration units, evaporative condensers, trends in low-temperature air-conditioning practice, methods of air distribution, and other sales-engineering subjects.

W. McElhinny

* * *

Veteran Executive Dies in Dayton

(Concluded from Page 1, Column 2)

ny, who resided with him; and a sister, Mrs. Caroline McElhinny Helsley, wife of Major Albert B. Helsley, United States army officer stationed at Grand Junction, Colo.

Mr. McElhinny was born on Oct. 27, 1892, in Johnstown, Pa., the son of a man active in the steel industry and associated with the late T. Coleman duPont.

In 1912, he was graduated from the University of Kentucky law school and immediately was admitted to the bar in Kentucky.

At the outbreak of the World War, he enlisted in the army aviation service and was sent to Cornell University as a student in the air service school. He was graduated as a qualified engineering officer and sent to Barron field, Fort Worth, Tex., where he went through flying school and came out a second lieutenant and military aviator.

Out of the army, he decided to devote his energy and aggressiveness to salesmanship and became associated with a small concern in Detroit known as the Frigidaire corporation which then was an independently financed organization.

His first sales were to Pierre duPont, then chairman of the board of directors of General Motors, and to John J. Raskob, then a General Motors official, later Mr. duPont's successor as chairman. Shortly after Mr. McElhinny joined it, W. C. Durant, then president of General Motors, bought it as a personal investment, only to sell it within a few months to General Motors, which immediately transferred the concern to Dayton and made it a part of Delco-Light Co.

Mr. McElhinny became a regional manager for the refrigeration department of Delco-Light, then was promoted to the assistant sales managership in charge of eastern states. He then was promoted to commercial sales manager and as such, he obtained the first million dollar order in the refrigeration industry.

In 1926, anxious to try his talent with a new organization, he went to Detroit as vice president in charge of sales for Copeland Products, Inc. In May, 1933, he returned to Dayton as manager of Frigidaire's commercial division, a position he held until last July, when he was made manager of a newly formed wholesale division.

Active in Dayton civic, social, and fraternal life, he was a 32nd degree Mason, a Shriner, and a member of the Dayton Country Club.

Air-Conditioning Installations in Dallas

Type of Installation	Prior to 1935 No.	Prior to 1935 Hp.	1935 No.	1935 Hp.	Total No.	Total Hp.
Residence	23	45.9	18	57.27	41	103.17
Apartment	1	1.05	3	13.45	4	14.50
Private Office	10	29.12	8	15.35	18	44.47
Restaurant	4	90.0	3	32.75	7	122.75
Hotel	1	496.0	2	149.50	3	645.50
Department Store	2	694.28	..	.....	2	694.28
Retail Store	6	275.25	6	77.98	12	353.23
Air-Conditioning Dealer	4	28.45	6	26.61	10	55.06
Office, Commercial	6	105.55	9	87.37	15	192.92
Office Building	1	33.0	3	551.35	3	584.35
Utility Store & Auditorium	1	234.5	..	.....	1	234.50
Bank	1	392.5	..	.....	1	392.50
Bank Accounting Offices	1	90.0	..	.....	1	90.00
Bank Director Rooms	2	4.2	..	.....	2	4.20
Brokers Office	1	28.25	..	.....	1	28.25
Funeral Parlors	1	10.0	1	18.0	2	28.00
Theaters	3	760.25	2	107.50	4	867.75
Offices & Sales Rooms	..	.....	2	57.33	2	57.33
Federal Court Room	..	.....	1	11.75	1	11.75
Total	**68**	**3,318.30**	**64**	**1,206.21**	**130**	**4,524.51**

64 Air-Conditioning Sales in 1935 Set Dallas Record

(Concluded from Page 1, Column 5)

the city, totaling 551 hp. Previously, but one office building had been air conditioned, for 33 hp.

Next, in point of size, were two installations in the city's hotels, totaling approximately 150 hp., and an equal number, totaling approximately 108 hp., in theaters. Three hotels and four theaters in the city now have air-conditioning equipment.

Residential conditioning showed a satisfactory margin for the year, the 18 installations reported being only five short of the 23 made in all years before last. Forty-one homes in the city are now conditioned, the horsepower load being 103.17.

Apartments showed an encouraging gain for the year, three installations being reported, against only one in all previous years.

The private office field was another to show marked activity for the year, eight installations being reported, compared with 10 for all the years before 1935. Six installations were made in retail stores, six in the establishments of air-conditioning dealers in the city, and nine in commercial offices.

Another busy field was the restaurant classification, with its three installations for 1935 lacking only one of the total reported in all the years before. Two funeral parlors in the city are now conditioned, one being added last year to the one previously in existence.

Two new fields were entered during the year—combination offices and sales rooms, and court rooms. Two office-salesrooms installations were reported, for a total of 57 hp. The court room installation was in the Dallas U. S. District Court chambers, and totaled 11.75 hp.

Directors of Jobbers & Parts Manufacturers Groups Convene

(Concluded from Page 1, Column 1)

jobbers who have qualified under the definition will be made public at some future date.

The directors of the Jobbers Association took another step towards closer cooperation with the manufacturers by appointing Frank Gleason of Detroit as executive secretary. Mr. Gleason is also the secretary of the Parts Manufacturers Association.

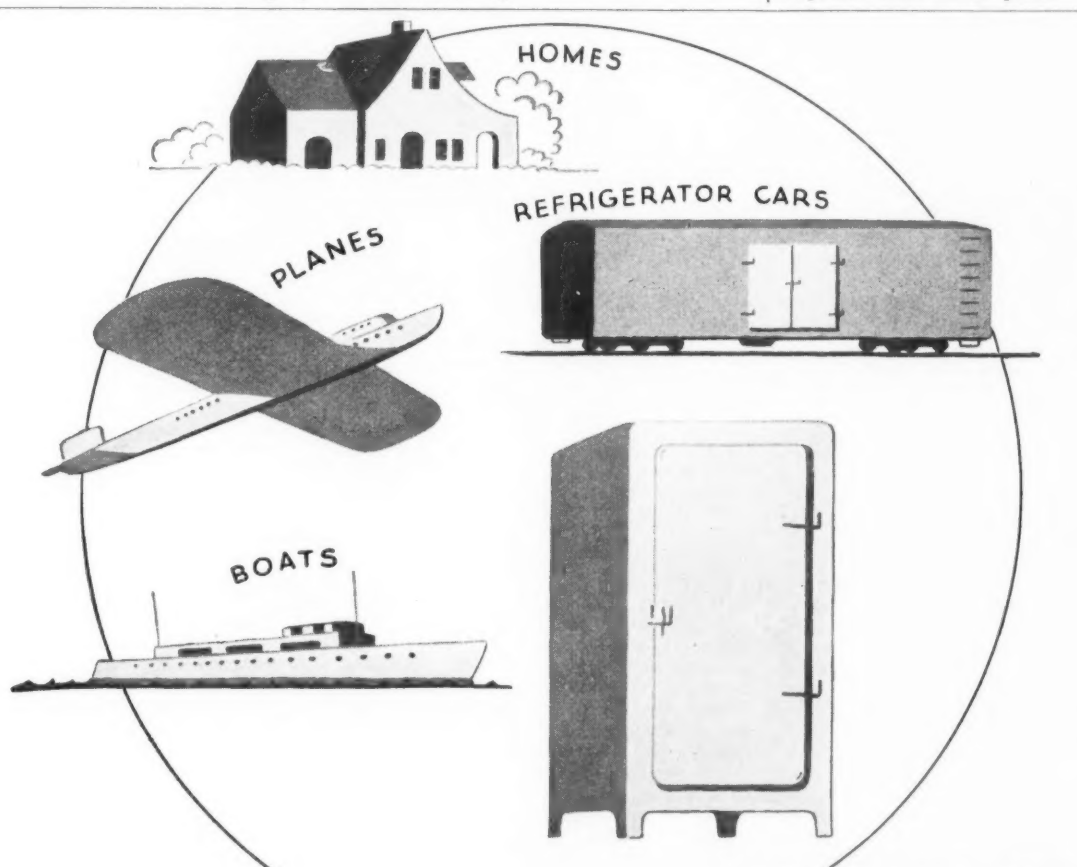
Meeting of the directors of the Refrigeration Supplies and Parts Manufacturers was called to order Wednesday morning by Chairman J. D. Colyer of the Wolverine Tube Co. Following members of the board were present: D. H. Daskal, Perfection Refrigeration Parts Co.; K. B. Thorndike, Detroit Lubricator Co.; H. V. Higley, Ansul Chemical Co.; F. L. Riggin, Jr., Mueller Brass Co.; R. W. Kritzer, Peerless Ice Machine Co.; Edward Gammie, Victor Mfg. & Gasket Co.; and C. M. Brown, Tecumseh Products Co.

Directors of the National Refrigeration Supplies Jobbers Association who were present at the joint meeting Wednesday afternoon included:

H. S. Dessau, Melchior, Armstrong, Dessau Co., New York City; Irving Alter, Harry Alter Co., Chicago; H. S. McCloud, Williams & Co., Pittsburgh; H. W. Blythe, H. W. Blythe Co., Chicago; R. H. Spangler, Spangler Co., St. Louis; H. E. Adams, The Lewis Supply Co., Memphis; and H. W. Small, Thermal Service Co., St. Paul.

Mr. Dessau had been elected a director of the Jobbers Association, to fill a vacancy on the board, at the morning meeting of that organization.

The joint session opened at 2:30 p. m. Wednesday afternoon, and did not adjourn until 10:30 p. m.



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Air Conditioning

Fin Coil Capacity Determined by Overall Heat Transfer Coefficient Plotted Against Air Velocity, Experiments Indicate

CHICAGO—Tests on fin coils conducted at the Case School of Applied Science in cooperation with the research laboratory of the A.S.H.V.E. have demonstrated that performance tables for such coils may be built on the basis of a few simple straight-line graphs of overall heat transfer coefficient plotted against air velocity, declared G. L. Tuve of the Case School in speaking before the A.S.H.V.E. convention here last week.

Such graphs may be plotted, on logarithmic coordinates, by locating the value of the coefficient at 500 f.p.m. air velocity, and then drawing a line of given slope. This same method provides a means for obtaining the capacity of a unit at any operating condition when the capacity at another operating condition is known.

For rapid approximate calculations, said Mr. Tuve, the capacity of a heating or dry coil may be assumed to vary directly as the square root of the air velocity.

Local Eddies Increase Transfer

The study also showed that any arrangement which increases the local eddies in the air stream will increase heat transfer, especially at the high velocities. For maximum heat transfer, declared Mr. Tuve, the fin tubes should be placed as close together as is possible without interlocking, arranged in staggered rows, and provided with a turbulence-grid in front of the section to increase the effectiveness of the front row of tubes.

While there is now a fair knowledge of the laws of performance of fin tubes, the data at present available to engineers are in some respects inconsistent, believes Mr. Tuve. More study and research is necessary, especially in the field of dehumidification, in order to establish a satisfactory basis for uniform methods of rating these units.

Uniform Testing Method

"It would seem desirable for the A.S.H.V.E. to establish a simple and uniform method for testing any given design of extended surface unit, and to specify certain features in the developing of complete performance tables from such tests," he said.

"In the final practical application involving the selection of a coil for a given service, a complete performance table should be available for each working fluid, such as steam, cold water, Freon, etc. Each table should show the change in performance due to changes in the velocity, temperature and humidity of the entering air, and due to changes in the number and arrangement of the tube elements. For hot or cold water circulation, the water velocity must also be taken into account."

"Is there not some simple way of stating the basic performance factors for a given type of extended surface, so that the effect of changes in operating conditions may be readily calculated?" asked Mr. Tuve.

He cited the use of the *overall coefficient* by engineers as the basis for general heat transfer calculations.

It has been proven by experiment, said Mr. Tuve, that under almost all conditions the simple exponential equation applies to the relation between the overall coefficient and the air velocity, *i.e.*, $U = \text{const.} \times V^n$.

It will be noted that this is the equation of a straight line on logarithmic coordinates. The value of the coefficient for any and all air velocities can, therefore, be obtained if only one point and the slope of this line are known.

Majority Use Same Basis

Makers and users of extended-surface units have gradually adopted the practice of using this straight-line relation on the logarithmic graph of capacity against air velocity, so that most performance tables are now built on this basis. This relation could to advantage be more generally used by engineers, and it could well be used as a basis for establishing a standard method for testing and rating fin-tube coils, declared Mr. Tuve.

From the standpoint of fixing a point and then drawing a line of a given slope through this point, attention may be confined to two questions:

1. What factors determine the capacity of a fin-tube unit at the *standard* face velocity of 500 f.p.m.

2. What factors determine the slope of the straight line (on logarithmic coordinates) showing the relation between coil capacity and face velocity of the air?

Expression of Overall Coefficient

The *overall coefficient* (U or K), or *specific capacity* is expressed in B.t.u. per hour per sq. ft. of air-side surface area per degree of temperature difference between the mean temperature of the air and that of the heating or cooling fluid.

Knowing the performance at one air velocity, the coefficient at any other velocity may be obtained by drawing a straight line through the given point on a logarithmic plot of overall coefficient against air velocity.

The value of the slope n may readily be calculated from any performance table, even when the coil dimensions are not given and the overall coefficient cannot be calculated, said Mr. Tuve.

Good Connection Necessary

Results of the research project to date, says Mr. Tuve, have demonstrated that if there is a good bond between fin and tube, the rather narrow differences in design proportions at present used by manufacturers of circular fin-tubes do not make a great deal of difference in heat transfer coefficients compared with the differences which are due to operating conditions.

"Assuming that a typical section of a certain design has been tested according to a standard method (say with low pressure steam), and the values of U_{500} and n have been determined as already suggested, it would then be desirable if tables could then be built to give the performance of a similar section with any number of rows of tubes, or operating under any typical condition of heating, cooling, or dehumidifying," he said.

"To so convert the performance under one set of conditions to that under another set of conditions will require that answers to the following questions be known:

"1. What is the effect of increasing or decreasing the number of tube rows, i. e., changing the depth of the coil?

"2. What is the effect on the capacity of a coil if staggered tube arrangement is used, as compared with in-line arrangement?

"3. For round-fin tubes, what is the effect of changing the center distance of the tubes in one row, or of changing the distance between rows?

"4. What is the effect of changing the coil service from heating to cooling or vice versa?

"5. When a liquid is used in the tubes (water or brine), how does changing the liquid velocity change the overall coil performance?

"6. How is coil performance affected by the nature of the fluid used in the tubes, i.e., steam, hot water, cold water, Freon, etc.?

"7. How can the dehumidifying performance at various humidities be predicted from the dry-coil performance?"

Increase in Depth of Coil

Mr. Tuve's answer to these questions which he discussed in turn, are presented in condensed form as follows:

Questions 1 and 2. Staggered Arrangement and Depth of Coil.

Increasing the number of tube rows and staggering the tubes are two of the several methods for increasing the local air turbulence or eddying to which the coil surfaces are exposed.

Several investigations have demonstrated that the effect of increased turbulence is to increase both the overall coefficient U at a given air velocity and the slope n of the capacity-velocity curve.

It was noted that the 6-row section was the most effective when the air velocity is high, but that the 2-row section gives a slightly higher coefficient when the velocity is very low. This relation has been confirmed by tests on three types of units, and for both heating and cooling.

Certain manufacturers at present use the same coefficient for any number of rows of tubes, and several manufacturers use the same value of the slope, irrespective of the depth of section. These practices are contrary to the results of repeated tests in this research.

Results with Staggered Arrangement

Effect of staggering fin tubes is probably less than that for plain tubes.

Results obtained by tests on a 2-row unit with close tube centers showed only 5 per cent more heat transfer when the tubes were staggered, while a disturber-grid placed in front of the section increased its capacity 16 per cent.

Increase in capacity due to staggered tube arrangement, compared with in-line arrangement, is greater as the depth of the coil is increased, and it is more important with high velocities and wide tube spacings, probably reaching about 15 per cent in some cases.

Most important loss in heat transfer due to lack of air turbulence is in the first or upstream row of tubes which receives the undisturbed air stream, and this condition is, of course, not improved by staggering the tubes. It has been demonstrated repeatedly in this research that the effectiveness of the first row may be brought up to that of the others by the use of a disturber-grid placed in front of the section.

Limits to Reduction of Free Area

Question 3. Relation of Free Area to Gross Face Area.

In general, the smaller the free area for a given face area, the higher will be the heat transfer coefficient. This is because the heat transfer is dependent upon the velocity *at the surface*, and the latter is comparable to the velocity through the free-open area.

There are practical limits to the reduction of free area, mainly those of air resistance and air noise, and hence the range of *percentage free area* used in practice is rather small.

In general the best spacing is probably that which places the fins as close together as is possible without interlocking.

Same Tube for Heating and Cooling

Question 4. Heating and Cooling Service from the Same Coil.

Difficulty of comparing the heat transfer coefficients for heating and cooling is that several other conditions are also changed when the direction of heat flow is reversed.

Cooling is carried out at a lower temperature level and with a smaller temperature difference than heating. Cooling fluids usually show a lower surface coefficient (inside the tubes) than is obtained with steam or hot water. These differences all tend toward a lower overall coefficient for cooling coils.

There are some inconsistencies in commercial practice, regarding capacities of the same coil for heating and cooling, as is shown by the fact that one manufacturer uses the same overall coefficients for heating with steam and for cooling with water (high water velocity), while another shows a 30 per cent difference between the two.

Experiments are now in progress as a part of this research, in which, for instance, 80° air is first cooled with 40° water and then heated with 120° water, all other conditions remaining constant.

Effect of Liquid Velocity

Question 5. Effect of Liquid Velocity in Tubes.

Low liquid velocity means a low coefficient U and a lower value of the capacity-velocity slope n. This is because of the high resistance to heat flow offered by the thicker viscous film of liquid at the inside tube wall when the average velocity of the liquid is reduced. The magnitude of this effect depends on the viscosity of the liquid and on the tube diameter.

There is both a rapid decrease in heat transfer and a rapid increase in friction coefficient when the Reynolds number of the liquid flow is so low that the flow changes from turbulent to viscous in character. Hence it would seem to be poor practice to operate coils with viscous flow in the tubes.

To avoid the viscous region, liquid velocities in cooling coils should be well above 1 f.p.s. for water and above 2 f.p.s. for brine. For smaller tubes than ⅝ in. even higher velocities are necessary.

For heating coils, on the other hand, the low limit of velocities usually depends on the allowable temperature drop of the water rather than on the encountering of viscous flow. This is because the viscosity of 160° water is only one-fourth as great as that of 40° water.

Use of Different Liquids

Question 6. Effect of Changing the Fluid in the Tubes.

More data is needed on surface coefficients for the fluids inside the tubes. Work is now in progress in this research on direct expansion of Freon.

The ordinary range of inside surface coefficients for steam, direct-expansion refrigerants, and water (above critical velocity) is probably from 250 to 1,200. The coefficient should be higher for steam, but difficulties in securing adequate venting of air and uniform distribution to all tubes are often great.

Pownall suggests a value of 300 for Freon and gives a range of 350 for cold water at 2 f.p.s. to 1,200 at 6 f.p.s.

The effect of a change from 250 to 1,200 is to change the overall coefficient from 7.1 to 9.2 in a typical case in which the surface area-ratio is 10 and the air-side coefficient (including temperature gradient factor) is assumed constant at a value of 10, at a face velocity of 500 f.p.m. Thus the overall coefficient is increased almost 500 per cent.

Dehumidifying Coils

Question 7. Dehumidifying Coils.

When a coil is used for dehumidifying, its capacity, based on dry-bulb temperature, is very much increased as compared with dry-cooling only, but it is difficult to show this increase by any simple method.

The presence of dehumidification not merely adds another variable, but it adds an entire heat transfer process, that is the condensation of a vapor. This process in turn is sensitive to most of the variable conditions which affect dry cooling. In addition, it is one of the most complex of the heat transfer processes, as is shown by the current arguments regarding drop-condensation and film-condensation.

There are four general methods of determining the performance of a dehumidifying coil, but at present there is apparently not enough research data available to establish full confidence in any one of these methods, said Mr. Tuve.

Armstrong Booklet Tells Uses of Vibracork

LANCASTER, Pa.—Armstrong Cork Products Co. has issued a booklet explaining the uses of its product, "Vibracork," in reducing vibration caused by rotating or reciprocating machinery such as motors, fans, pumps, blowers, generators, presses, and similar equipment.

Photos of equipment insulated with Vibracock are shown in the booklet.

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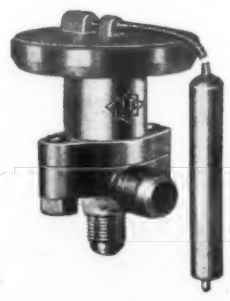

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Tests Show 'Comfort Range' for Summer Air Conditioning and Demonstrate That Relative Humidity Isn't So Important

CHICAGO—People will be comfortable within from 20 to 40 minutes after entering a place that has an effective temperature range of 70 or 71° to 74 or 75°, and the severity of the outside condition and the relative humidity of the cooled inside condition have little effect upon the sensation of a person entering a place with such atmospheric conditions, it was stated by F. C. Houghten and Carl Gutberlet of the A.S.H.V.E. laboratory in reporting, at the convention here last week, the results of tests made on "Comfort Standards for Summer Air Conditioning."

One of the most important findings in the test was that relative humidity over a considerable range is of much less importance than had been supposed, as far as feeling of actual comfort is concerned.

The effective temperature scale presented to the American Society of Heating and Ventilating Engineers by its research laboratory in 1923, and the subsequent development of the winter and summer comfort zones were assumed at the time to apply universally to indoor air conditioning, regardless of daily variations in the outdoor temperature and the length of exposure of occupants to indoor conditions, said the authors.

Information Not Adequate

In applying these findings to air conditioning in theaters and elsewhere, it soon appeared that the information available was not adequate and that some consideration should be given to the temperature of the outside air. It was assumed as a result of practical applications in the air conditioning field that rigid limits had to be applied to the moisture content of the indoor air in order to avoid sensible perspiration and other undesirable effects.

Consequently there has been developed, largely through box office complaints in theaters, a variable indoor summer cooling standard based upon the outdoor dry-bulb temperature, which has been used as a standard in the air conditioning chapter of the A.S.H.V.E. Guide since 1933. (See Table 1.)

Moisture Content

The authors pointed out that this standard allows only a single definite moisture content of dewpoint temperature of the air, regardless of outside conditions, and a definite indoor dry-bulb temperature for any given dry-bulb temperature outside.

"Attempts to apply this standard in practice for different air conditioning applications and with different types of equipment have resulted in considerable chaos and dissatisfaction, resulting in the resubmission of the study to the Society's research laboratory," they said.

In making the study, five students of the University of Pittsburgh acting as subjects judged their feelings of warmth in various atmospheric conditions in the psychrometric rooms of the research laboratory, located in the Pittsburgh Experiment Station of the United States Bureau of Mines.

Effective Temperature Important

"While the results of the study are not entirely conclusive as regards all phases of the subject," say the authors, "they are particularly conclusive in demonstrating that the effective temperature of the indoor condition is of much greater importance than the moisture content of the air inside, or the dry-bulb temperature of the atmosphere outside.

"It is shown that air conditions ranging from 70 or 71° to 74 or 75° effective temperature give a feeling of comfort, as far as warmth is concerned, over a wide range of moisture content throughout the summer months, regardless of the prevailing outside temperature on any particular day."

In the test rooms any condition desired for summer cooling between 30 and 90 per cent relative humidity could be maintained with ease. The subjects were dressed in the usual fashion and carried on normal activities, but were subject to both normal and abnormal temperature conditions before entering the cooled chamber.

During the early part of the study a number of tests were made in constant atmospheric conditions designed to give comfort in accordance with the present A.S.H.V.E. Guide standards, or with moisture content at some definite percentage of relative humidity above or below this standard.

"These tests proved that conditions dictated by the present Guide standard invariably gave comfort," say the authors, "but wide variations in relative humidity also resulted in comfort provided the same effective temperature was maintained."

It was observed that invariably the subjects felt very warm before entering the test chamber and were perspiring in varying degrees. Immediately upon entering the cooled chamber a cool shock was usually experienced.

"However, this shock was of short duration, so that recovery to a feeling of comfort or warmer than comfortable was recorded by 10 minutes after entering.

"Usually from 20 to 45 minutes were required for all subjects to reach a comfort feeling of 'comfortable.' Sensible perspiration usually disappeared rapidly. In most instances a comfortable feeling was experienced about the same time that sensible perspiration disappeared.

Normal in 2 or 3 Hours

"The body temperature upon entering was usually close to a degree above the generally accepted normal of 98.6° F. as a result of the subjects walking in the high outside temperature. Upon entering the cooled room the body temperature invariably dropped slowly and in most cases reached normal in two or three hours."

After the approximate boundaries of the comfort zone were established by variable air condition tests, a few tests were made in various constant air conditions in the apparent comfort zone or near its boundaries, in order to determine any variation in feeling upon entering such conditions from a hot atmosphere. Two series of such tests were made.

In the first series tests were made in atmospheric conditions of 76, 73, 70 and 68° effective temperature and 85 per cent relative humidity, and tests at approximately the same effective temperatures, but with relative humidity in the neighborhood of 30 to 40 per cent.

All of these tests were entered from a hot condition of 86° F. dry-bulb and 81.5 per cent relative humidity, maintained with small variation in an adjoining room.

Results of Other Tests

Another series of four tests was made in conditions of 76 and 70° effective temperature with 85 per cent relative humidity, and approximately the same effective temperatures but with relative humidities in the neighborhood of 30 to 40 per cent, all entered from a condition of 95° F. dry-bulb and 81° F. wet-bulb maintained in an adjoining room.

"The subjects showed mixed feelings of comfort and too warm or too cold in conditions near the upper or lower boundaries of the comfort zone," reported Messrs. Houghten and Gutberlet.

"Tests made near the center of the zone usually showed entire agreement in the feeling of warmth of the five subjects as soon as equilibrium had been reached.

"Examination of the results of the four tests made in constant conditions at 75 and 76° effective temperature shows that the average feeling of all the subjects never reached comfort for these effective temperatures either with low or high relative humidity. Actually, a mixed feeling of too warm and comfortable was indicated by the individual subjects in these tests.

"The two tests made at 85 per cent relative humidity show a greater persistance in the appearance of sensible perspiration than was the case in the low relative humidity condition. It should be noted, however, that the effective temperature was one degree higher in the 85 per cent relative humidity test.

Reactions of Subjects Lag

"A look at the variable condition tests shows a rather sharp division between reactions of comfort and too warm at about 75° effective temperature. Actually there is some overlapping as would be expected in data of this kind. Also there is a little tendency for the reactions felt by the subjects to lag.

These tests indicate a perspiration line somewhere between 76 and 78° effective temperature, with considerable likelihood of sensible perspiration appearing when the effective temperature is 76° or higher."

Both types of tests, the authors related, indicated likelihood of a feeling of coolness when the effective temperature is below 70°. This boundary of the comfort zone is, however, not quite as sharply indicated by the tests as is the upper limit of 75° effective temperature.

Some tests show all subjects to be comfortable at 68° effective temperature, while in some instances comfort was not reached even at a little above 70° effective temperature.

"There is a rather persistent tendency shown by the data for a feeling of comfort to be recorded at a lower effective temperature with low relative humidities than at high relative humidities. The study indicates that a feeling of comfort may be expected at an effective temperature 1° lower at about 30 or 40 per cent relative humidity than at 85 per cent relative humidity.

"With very few exceptions, tests made in either constant or varying atmospheric conditions show that the subjects quickly experienced a feeling of comfort when the effective temperature ranged from 70 to 75°.

"In most tests made in conditions within this range, and more particularly within a range of effective temperatures from 71 to 74°, the subjects showed complete agreement in their feeling of comfort as regards warmth. As the limits of this range on either side are approached or passed, agreement was not so certain."

'Cool Shock' Reported

According to those conducting the tests, there was in almost all cases a feeling of "cool shock" upon a subject's entering a cooled atmosphere from a hot condition. This shock was experienced by the subjects without discomfort. While the condition felt cool, the contrast with the hot condition was pleasing rather than uncomfortable in most instances.

In this connection it should be kept in mind, however, that the subjects were all young men with strong vitality and that the contrast upon entering and cooled atmosphere might be quite different for an older person having a lower vitality.

The shock upon entering a cooled atmosphere from one of higher temperature is usually considered psychological rather than physical or physiological, but it can, however, be easily explained on a purely physical basis, the authors said.

Briefly, what happens is that upon entering a cooled room the sensible heat loss dissipated from the body by radiation and convection is greatly increased, and the body being wet with perspiration, the latent heat loss continues at a high value which naturally gives a sudden cool shock.

Considerable confusion exists regarding the effect of relative humidity on the comfort of occupants of space cooled during the summer, believe Messrs. Houghten and Gutberlet. They say:

"The observations which were possible during the study of feeling of warmth indicate rather conclusively, however, that relative humidity over a considerable range is of much less importance than had been supposed.

"In fact, the study indicates that a person having no knowledge of atmospheric conditioning in general and of the particular conditions pertaining around him seems to have little conception of the moisture content of the air. There was a tendency for those subjects in this classification to interpret as humid any hot condition where they perspired freely. Some such reactions were recorded when the relative humidity was actually as low as 30 per cent.

"A person more accustomed to air conditioning seems to judge the relative humidity of the air in which he is located more by the feeling of clothing and other objects outside of his body, rather than by sensations resulting from contact between his body and the atmosphere.

Effect of High Humidities

"If high relative humidities are to be avoided it should be on account of their effect on objects within the occupied space, rather than due to any feeling of the occupants themselves.

"At 85 per cent relative humidity the feeling of paper and the way it handles is greatly affected, particularly when the dry-bulb approaches or exceeds 75° F.

"Colored drawing pencils used by the subjects in plotting data during the tests tended to become soft and unusable, carbon paper used in the typewriter became soft and smudgy, and attempts to erase on typewritten sheets resulted in a smeared appearance.

"Atmospheric conditions with relative humidities in the neighborhood of 20 per cent and around 75° effective temperature occasionally gave a dry burning sensation immediately after being entered, particularly when entered from a cooler condition. This sensation, however, quickly disappeared and probably resulted from lack of immediate physiological adjustment in the secretion of perspiration upon entering this condition from one where a lower rate of secretion of invisible perspiration was required.

"As a result of the study made during the past summer, it appears that no limitation need be placed on relative humidities between 30 and 60 per cent and that there is a possibility that further study may further expand these limits."

With respect to the matter of variations in the indoor cooling standard with outdoor temperature, the authors had the following to say:

"A great deal of attention has been given in recent years to variations in the dry-bulb temperature of indoor cooled conditions with variations in the daily outside temperature. The time available during the short summer period did not permit an intensive study of this phase of the subject.

"Such observations as were made did not, however, indicate any wide variation in comfort at any given effective temperature depending upon the outside temperature prior to the subjects entering the test chamber.

"Probably of greater importance is the question of variation in the desired indoor conditions with the average daily maximum temperature throughout the summer season in any particular latitude.

"In this connection it is frequently assumed that because of the higher average daily maximum temperature in southern districts a higher effective temperature should be maintained indoors.

"Considering the fact that the comfort zone moves from a range of 63 to 70° effective temperature to a range of from 70 to 75° effective temperature for the latitude of Pittsburgh between the period of winter heating and summer cooling, it is natural to suppose that there will be a further change with more severe summer conditions.

"It should be observed, however, that if the comfort zone moves much higher with more severe summer conditions the perspiration line must also move upward. Data are not available to indicate whether this is true or not."

Summary of Test Results

Results of the tests were summarized as follows:

"The study indicates rather conclusively that the average person will become comfortable within from 20 to 40 minutes after entering any atmospheric condition within an effective temperature range of 70 or 71° to 74 or 75°.

"Within this range no appreciable variation was observed in the magnitude or the duration of the cooling shock with either the relative humidity or the cooled condition or the severity of the previous condition.

"Also, little variation in the rate of disappearance of sensible perspiration was observed for relative humidities up to 65 per cent; for relative humidities as high as 85 per cent there seem to be some increase in the length of time necessary for the complete disappearance of sensible perspiration."

Table 1

Table 1—Desirable Indoor Air Conditions In Summer Corresponding to Outdoor Temperatures*

(Applicable to Exposures Less Than 3 Hrs.)

Outdoor Temp. (Deg. F.) Dry-Bulb	Indoor Air Conditions with Dew Point Constant At 57° F. Dry-Bulb	Wet-Bulb	Effective Temp.
95	80.0	65.0	73
90	78.0	64.5	72
85	76.5	64.0	71
80	75.0	63.5	70
75	73.5	63.0	69
70	72.0	62.5	68

*From A.S.H.V.E. Guide, 1935, Chapter 2, Table 2, Page 48.

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Efficiency Sacrificed by Combining Heating and Cooling Systems, Overton Tells Warm Air Group

CHICAGO—Combination of a heating and cooling system, with a common duct system, will mean the sacrificing of the efficiency of one or the other, Platte Overton, consulting engineer, asserted in an address before members of the Warm Air Heating & Air Conditioning Association during their meeting here last week.

"The efficiency and proper design of the heating system cannot be sacrificed to include cooling," Mr. Overton declared. "After all, the heating season is from five to six months, depending on the location, while cooling may be only a matter of days instead of months."

Opposites of Systems

The speaker said he was convinced that the two systems, indirect heating and cooling, are diametrical in general design, volume of air, location of inlets, controls, and many other items, as well as in their effects on the temperament and psychology of the people who occupy the homes in which they are installed.

He recalled the case of a Chicago woman, who had a forced air heating system in her home, and complained that it was a failure, because she could hear the noise of the fan. In the summer, she complained that the cooling system couldn't be working, because she couldn't hear anything. She was cool, contented, and happy when she could hear the noise of the fan and compressor, but she got a chill on the winter day that she could hear the oil burner and fan.

"In a recent talk before the American Society of Heating and Ventilating Engineers," Mr. Overton said, "a speaker is credited with the statement that, when the outside weather was in the zeros, air conditioning was considerable bunk. What people wanted at that time was heat and plenty of it. This statement was capitalized on by a prominent manufacturer of direct radiation, who pointed out that a designer and advocate of indirect heating admitted that in extreme weather some type of direct radiating surface was necessary.

"With reservations to those in the mechanical heating industry who believe that all that is necessary is to blow some warm air into a room, I can only say that the statement is true, and, if I must leave my home to be heated by a contractor who believed that he had an air-conditioning system because he had a warm air inlet and a return in each room, I should fill my house with radiators.

"To begin with, the modern cooling system in the average home, I believe, is in that dim distant future when every man owns an aeroplane. Some cooling systems will be installed in homes of $12,000 or over as soon as there are two chickens in every pot and a car in every garage. It would be all very simple if I were to say that all one needed to do was to design a mechanical system of heating with one or more inlets in each room, in connection with one or more returns from the same room and simply blow in cold air in summer and warm air in the winter.

Proportion of Air Volume

"It is a generally accepted rule that the proportion of air volume in cooling and heating is about 12 to five—12 for cooling, five for heating. Personally, I believe that present engineering standards of heating, with their rough estimates of 10-minute air changes, 7½-minute air changes, and what have you, are all too high, whereas the cooling standards, if there are any, are much too low. The proportion, in my opinion, is more likely to be 12 to three or four than 12 to five.

Within five years, forced air ducts (trunk lines and branches) will be half their present size, Mr. Overton predicted. That would eliminate any chance of using these ducts for cooling.

"In the next few years, hundreds of thousands of homes will be built. These people are going to move out of hotels, flats, apartments, and old homes now adequately heated with direct radiation. We must give them what they have had—steady heat, warm walls, no cold 70, *plus* air cleaning, the proper humidity, elimination of radiators—at least where they can be seen or are in the way—and automatic heating. I say automatic heating because the day of hand firing is rapidly vanishing.

Careful Designing Needed

"In many large housing problems now in development, where homes must be built complete for less than $5,000 each, automatic heating, such as oil, gas, or stokers, is taken for granted. These systems must be carefully designed, though small, or indirect or forced air heating will lose its present popularity and direct radiator heating will come back. This is already true in some instances.

"Manufacturers, engineers, and contractors must realize that there is more to the problem than just blowing warm air into a room. This brings us back to the combination system. No doubt some cooling may be effected by using the warm air supply ducts to carry cool air into the room, but contractors should be careful what they guarantee.

Good Heating System Necessary

"I realize that this is a work-a-day world, in which, after all, we must compete with our brain, and, alas, with our price. The heating system that is practically, theoretically, and efficiently the last word may be an impossibility. The forced-air heated home that can be heated to 72° F. with absolute comfort in every room and corner, at the floor or breathing line, without drafts or cold 70 may be a dream at least within the range of the pocketbook of the average man who will build the average home in the next decade. So far as I can see, the cooling system is out. Architects, builders, and owners must be educated to demand a better class of indirect automatic heating, and, in my opinion, they should spend their money first for a good heating system.

"A few 'jerry' built forced air systems are not going to ruin the industry, as has already been proven, but even the present superior system can be improved on. The combination of a heating system and cooling system will mean the sacrifice of the efficiency of one or the other."

Combination System Impractical

After having, as he said, proved "conclusively" that a combination heating and cooling system was impractical under present conditions, Mr. Overton went on to describe experiments on just such a type of system, now being carried on in Chicago.

The experimental house is one of several built by the *Chicago Evening American*. It is forced-air heated, and the furnace is oil-fired, with an intermittent gun-type burner. The system in general is of conventional type, with twin blowers, filters, humidifier, and bonnet control of blower, trunk line, and branches.

The home's heating system, Mr. Overton said, has proved a success. Experiments with the cooling system will not be completed until the end of the coming summer.

"The cooling system consists of a 1½-ton compressor and the cooling coils are located in one of the return ducts on the suction side of the fan. Only one room is being cooled, the living room, and it requires ¾ ton of refrigeration at the peak load. A series of dampers were so installed that it is possible to switch the cooling from the living room to the master bedroom on the second floor.

"We chose a 1½-ton compressor in an effort to see just what degree of comfort cooling could be maintained in the entire house. It has been maintained or assumed that for the average home, a 3-hp. load is all that is practical, 1½ hp. for the lights, toaster, iron, washing machine, oil burner, fan, and so forth, leaving 1½ hp. for the cooling load. If we take this as a maximum of the power practical to install, we must fight the remaining load with insulation, double windows, awnings, and vestibules. The peak load, of course, is in the daytime with the full sun effect. No doubt at night, with the aid of outside air, this entire house will be comfortably cooled, even with an outside temperature of 90° F. and a high relative humidity."

Cooling Is Costly

Confessing a limited experience regarding cooling in residential work, Mr. Overton nevertheless is of the opinion that the human element involved is going to bring the grief.

"Cooling is costly," he said. "The contract price was as much for the cooling of this one room as it was for the heating of the entire house, and it will cost the owners from 20 to 30 cents per hour to maintain the guaranteed temperatures and relative humidity at the peak load.

"On this particular installation we are attempting to use the same ducts and air inlets for both heating and cooling. The success of this also remains to be seen. The returns from the living room are taken at the floor and ceiling line, those at the ceiling being used as returns for cooling. The system is figured for 100 per cent recirculation, but an outside air supply is provided, and we are trying an interesting stunt in connection with this outside air supply.

Location of Air Inlets

"The air inlets in this living room are under or below the large windows facing the west. This is ideal for heating, but not so good for cooling if the present engineering standards are to be relied on. The registers are designed to deflect the air upward at an angle of 45 degrees.

"Air volume to the living room and the master bedroom is proportioned about 15 to five for heating and 12 for cooling. The ducts for this section were designed larger than for the balance of the house. The blower will not be speeded up for cooling but the balance of the rooms will be cut off by dampers and the entire air delivery will be directed to this living room, with dampers to divert it to the master bedroom if desired.

Use of Cooling Water

"The cooling water to the shell and tube condenser may be wasted, or, through a hose connection, may be carried out to a lawn sprinkler. The evaporator or coils are laid flat over a pan, where any accumulated condensation may drip. This condensation is carried to the floor drain in the basement.

"At the suggestion of the manufacturer, this cooling water is taken through a coil before it reaches the compressor. This coil is located in the outside air supply duct. No data is available on this scheme, as no tests have been made, but the manufacturer's engineers hope to increase the efficiency of the system by this method."

Indirect heating is not merely a matter of blowing warmed air into the room or area to be heated, Mr. Overton said.

Redesigned by Other Crafts

"Contractors and engineers have evidently left this impression with architects and builders, for the heating and air-conditioning contractor is booted about by the carpenter, plumber, and electrician. If the designer has shown and specified an air inlet in a desired or strategic position, and it conflicts with any one of the crafts mentioned, the contractor is supposed to move said inlet to wherever he may find a place for it, and it is not uncommon for the other tradesmen to advise the contractor on its location.

"After the system has been correctly designed it is generally redesigned by the other crafts on the job, and all this regardless of the fact that the material may be all made up.

"Just what brought about this inferiority complex on the part of the contractor I do not know, but I have a suspicion that it is due to lack of knowledge on his part.

"This inferiority complex is exemplified in many of the cases where the system failed to give the proper results. The contractor arrived on the job with a system designed to the nth degree. When the architect, builder, and owner finished with the contractor, his plan resembled the ruins of Jerico—and the worse part of the deal is that he takes it. I have been the victim of such mediocre items as clothes chutes, telephone niches, and speaking tubes. In the mind of the architect, builder, and owner, these items are holy, and emulate the entire air-conditioning system in the importance of their location."

Taylor Urges Contractors To Study Specialty Selling Methods

Contractors who want to keep their places in the merchandising picture of the future will be wise to make direct, specialty selling tactics a part of their regular selling procedure, L. R. Taylor, of International Heater Co., Utica, N. Y., told members of the Warm Air Heating & Air Conditioning Association at their Thursday morning meeting.

Discussing "Merchandising in Our Industry," Mr. Taylor urged members of the association to cooperate fully with manufacturers in doing the best selling job possible, but cautioned them against "going blindly into the direct selling field" without first giving it the benefit of careful forethought and preparation.

Study Individual Markets

"Study your individual market possibilities," Mr. Taylor told the contractors. "Sales figures for 1935 show that one furnace was sold to approximately every 300 persons in the country. But we didn't sell these furnaces—people came in and bought them.

"Your local market may be either better or worse than the national average figure. It's up to you to know your own market, so you can do an effective job of customer contact and direct sales work."

Government aid, principally through the Federal Housing Administration, has greatly improved the market for heating and allied equipment in lower income classes, the speaker said.

"If warm air heating is properly merchandised, there is not enough plant space in the country to satisfy the demand that would result," Mr. Taylor declared.

Getting into the direct selling business, he emphasized, is not a matter of sudden decision and immediate action. To succeed, an understanding and observance of several fundamental principles is necessary.

Fundamentals of Selling

Mr. Taylor listed seven such principles:

"1. Know thoroughly the product you are going to sell.

"2. Determine the possibilities of your own particular market, and decide what is an adequate sales quota for your product.

"3. Clean up your store, and have your equipment attractively displayed. If you have no showroom, many dealers have made satisfactory arrangement with their local movie houses or automobile dealerships for display room space.

"4. Do some direct selling work, either personally or through trained salesmen. See that your salesmen know their product thoroughly, and supervise them carefully. Combine forces, if you want to, with your local plumber, coal merchant, oil burner dealers, and electricians. Sell the homeowner on modernization and improvements.

"5. Advertise consistently, and keep yourself and your product associated in the public's mind. Often, when you are unable to make extensive use of newspapers and other media, you can obtain envelope inserts and other mailing pieces from your manufacturer, to send to your customers and prospects at little or no cost.

"6. Carry a complete line of merchandise. Round out your selling line with oil burners, gas burners, stokers, and all other related equipment. Be the heating headquarters in your city.

"7. Plan ahead; have a definite program. Otherwise, chances are your efforts will be pretty much of a flop."

Effect of Govt. Program

The government's modernization program will greatly widen the market for heating equipment, Mr. Taylor said. Air conditioning will create another big market.

Many merchants complain, he added, that they do not receive the proper cooperation from their manufacturers, through national advertising, promotional campaigns, sales literature, etc.

"Manufacturers should do their part in bringing their products before the buying public; and most of them do more than their share," Mr. Taylor concluded. "But the merchant who isn't prepared to take advantage of this cooperation won't get any benefit from it.

"The good merchandisers will get the business."

He urged members of the association to cooperate fully with manufacturers, and work with them wherever possible. "Don't go out blindly on house-to-house selling," he cautioned, "and expect to obtain immediate results. You'll be disappointed if you do.

"Plan your direct selling program over a period of years—five or 10, for example. Look ahead; have an interest in the future as well as in the immediate present.

"Study your market and its possibilities. Know your community; know your product; make certain that your salesmen know it, too.

"Above all, plan your program carefully before you start. Direct selling requires a different type of technique, and preparation pays."

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Sunshine, Humidity & Ionization Affect Reactions to Outside Conditions, Studies Show

CHICAGO—Judgment of the pleasantness of outdoor atmospheric conditions, as evidenced in a study of the subjective reactions of some 80 persons, taken every morning for a year, is chiefly influenced by sunshine, next by relative humidity, and finally by the total ions, according to studies made by C. E. A. Winslow and L. P. Herrington of Yale University and reported at the A.S.H.V.E. meeting here last week.

The study was undertaken in an attempt to discover whether any subtle and hitherto unrecognized climatic factors might exert a demonstrable effect upon subjective reactions as to the pleasantness or unpleasantness of the outdoor atmosphere.

Summary of Basic Data

Basic data utilized may be summarized briefly as follows:

1. Records taken at 8 a. m. of air temperature, temperature change from preceding day at the same hour, relative humidity, sunlight (expressed in percentage of full sunshine for the hour 8-9 a. m.), sunshine change (as compared with the same hour on the preceding day), wind movement, barometer, and barometric change (as compared with the same hour on the preceding day). These data, for all week days for the period December, 1933, to February, 1935, inclusive, were furnished by Director Cornelius Doherty of the United States Weather Bureau Station at New Haven.

2. Records of ions present in the air outside the laboratory in New Haven at 9 a. m. each morning from January, 1934, to February, 1935, inclusive.

Expression of General Reactions

3. For the whole period of the study the authors obtained from a group of volunteers in New Haven an expression of their general reaction to the outdoor weather conditions as those conditions affected them on their way to their offices in the morning. Each person willing to aid in this study was provided each week with a record form ruled with five spaces for each day of the week (except Sunday), headed respectively *Very Pleasant, Pleasant, Indifferent, Unpleasant,* and *Very Unpleasant.*

Meteorological data taken by the authors show that the winter of 1933-34 was an unusually cold one with a mean temperature of 13° F. for the whole month of February, 1934. On two days in December, 1933, and on one day in February, 1934, temperatures below zero were recorded (–8°, –6°, and –14° respectively). During February, 1934, only six days showed temperatures over 20° and the maximum was 34°.

Temperature Changes Marked

During the three months' period (December - February) temperature changes from one day to another (in both cases at 8 a. m.) were often marked. In December, 1933, there was one increase of 27°. In January there were two increases of over 20° (22° and 23°), and two decreases of over 20° (22° and 32°). In February there were three increases of over 20° (24°, 26°, and 30°) and one decrease of the same magnitude (32°).

Relative humidity for these three months (December, 1933- February, 1934) averaged between 67 and 75 per cent and ranged from 31 per cent to 98 per cent. During the three months there were 11 values below 50 per cent and 13 values above 90 per cent. The percentage of sunshine averaged only 22 for January, 1934.

During the spring the usual changes occurred, rising temperature, increasing sunshine, decrease in wind movement, but no great average change in relative humidity. Mean monthly temperature was highest in July (72°). The maximum for this month was 81°, the minimum 65°.

Sunshine showed monthly maxima in March (50 per cent), April (57 per cent), and August (54 per cent).

Relative humidity reached a peak in September and November (78 and 80 per cent respectively). In September only four days fell below 75 per cent.

The winter months of December, 1934, to February, 1935, were much milder than the corresponding months of the previous year, particularly February.

Data on Weather Conditions

Data taken on weather conditions demonstrated that temperature is negatively correlated with the barometric reading, barometric change, wind and sunshine, and is positively correlated with temperature change and relative humidity. Temperature change shows the same general relations but has a very high correlation with barometric changes. Relative humidity is positively correlated with temperature and temperature change, and negatively correlated with sunshine, barometric change, and sunshine change.

Sunshine is positively correlated with barometer and barometric change, and negatively correlated with temperature change and relative humidity. Sunshine change is positively correlated with sunshine, and shows the same relations as sunshine to the other variables.

Barometer and barometric change are positively correlated with sunshine and with each other, and both are negatively correlated with temperature, temperature change, and relative humidity.

Ion Content of Air

With respect to ion content, the following relationships were observed for both positive and negative total ions:

Total ions increase:

1. With decrease in atmospheric temperature (except for winter quarter).
2. With increase in relative humidity (except for negative ions in the fall quarter).
3. With decrease in sunshine.
4. With decrease in windiness (except for the summer quarter).
5. With increase in barometric reading.

"It may be concluded," say the authors, "that the total ionic content of the atmosphere is highest on cool days, on days of high humidity, and on comparatively windless days; and that each of these tendencies is independent of the other two.

"All these phenomena are susceptible of reasonable explanation. The higher ionic content on cool days is consistent with the higher ion counts obtained in winter, and with the normal rise observed toward evening.

"When the air is cool the ions present tend to accumulate near the ground and furthermore, the tendency of ions to pass from the chimneys, surfaces, and openings of warm buildings into the cool air would be increased."

Analysis of Opinions

Analysis of results of the expressions of opinion as to the pleasantness of the outdoor weather conditions brought out the following:

1. The weather is more likely to be pronounced pleasant in fall and winter with decreased temperature, but shows no such relation in spring and summer.
2. The judgment of pleasantness increases very markedly with decrease in relative humidity.
3. It increases still more markedly with increase of sunshine.
4. It increases with decrease in wind velocity in two of the five quarters.
5. It increases with rising barometer.
6. It increases with a decrease in total ions of either sign.

"The absence of any correlation between the sensation of pleasureableness and temperature, except in the fall and winter months of 1934-35 is somewhat surprising," commented Messrs. Winslow and Herrington. "It is probably accounted for by the fact that votes were taken early in the morning when no extremely high temperatures occur. No doubt votes taken in the afternoon would have shown an inverse relation with temperature in summer.

Cold Mornings Preferred in Winter

"It is also somewhat unexpected to find that in winter cold mornings were voted more pleasant, but the correlation can presumably be explained by the bracing effect of such mornings.

"It seems quite evident from the picture as a whole that the human body acclimates itself (and clothes itself) in such a way that standards are rather closely adapted to the temperature to be expected at a given season."

The study showed four correlations between pleasantness and various weather conditions which are consistent and reasonably high throughout the year: a positive correlation with sunshine; a negative correlation with relative humidity; a positive correlation with barometric change; a negative correlation with total ions.

The correlation with barometric change is a secondary one since it disappears when sunshine is held constant. The other three relationships seem to be primary and independent.

Data taken showed that days on which the total ion content of the air is high are judged to be unpleasant, irrespective of sunshine and relative humidity.

Since the ions in city air are presumably largely made up of vapor particles from heating plants, automobile exhausts, and the like, it is believed that the observed correlation is most probably due to the effect of such substances in the atmosphere.

"If this conclusion is justified, it gives perhaps, new evidence of the subtle influence of odor upon human welfare," say the authors.

Summary of Data from Daily Observations

Table 1—Summary of Inter-Correlations Between Daily Observations, March, 1934-February, 1935

	Vote	Temp.	Temp. Chg.	Rel. Hum.	Sun.	Sun Chg.	Wind	Bar.	Bar. Chg.	Light Positive	Light Negative	Total Positive
Temp.	—.04											
Tem. chg.	—.18	.23										
Rel. Hum.	—.64	.24	.26									
Sunshine	.78	—.13	—.20	—.55								
Sun. chg.	.49	—.05	—.20	—.34	.64							
Wind	—.09	—.19	—.15	—.11	—.08	.02						
Barom'er	—.18	—.31	—.16	—.09	.26	.07	—.11					
Bar. chg.	.41	—.18	—.55	—.44	.43	.37	.00	.34				
Lt. Ions Positive	.15	.24	—.20	—.21	.18	.10	.00	—.12	.16			
Lt. Ions Negative	.03	—.16	—.18	—.24	.13	.07	.08	.07	.22	.30		
Total Ions Positive	—.35	—.34	.16	.26	—.20	—.13	—.23	.17	—.15	—.10	.16	
Total Ions Negative	—.34	—.36	.08	.25	—.22	—.06	—.18	.15	—.01	—.10	.19	.84

New York Gets Low Gas Rates for Conditioning

NEW YORK CITY—A new schedule of gas rates, featuring low rates for air conditioning and heating, was instituted Dec. 15 by Brooklyn Union Gas Co., which supplies most of the gas to Brooklyn and Queens boroughs.

Air-conditioning and heating rates for all types of buildings other than private residences will be: for the first 600 cu. ft., $1 per meter per month. For all over this the rate will be six cents per 100 cu. ft. For winter air conditioning and heating, minimum charge is $64 for the period from Oct. 1 to May 31. There is no minimum on summer air conditioning.

Building Owners Told To Condition Property

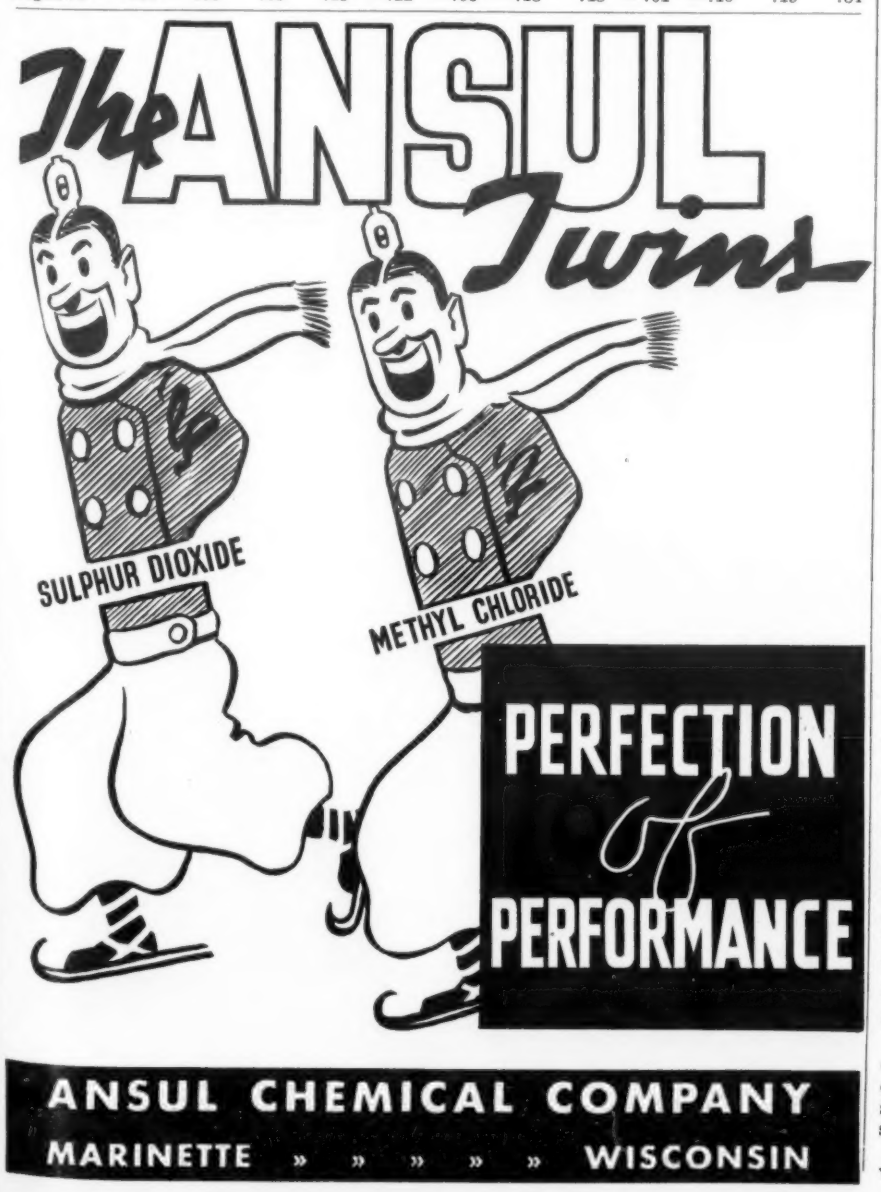
BIRMINGHAM, Ala. — Building owners must prepare to install air conditioning or else watch their property become obsolete and vacant, 200 delegates to the Southern Building Owners and Managers convention, meeting here Jan. 20-21, were told by E. B. Murray of Kansas City who spoke on air conditioning.

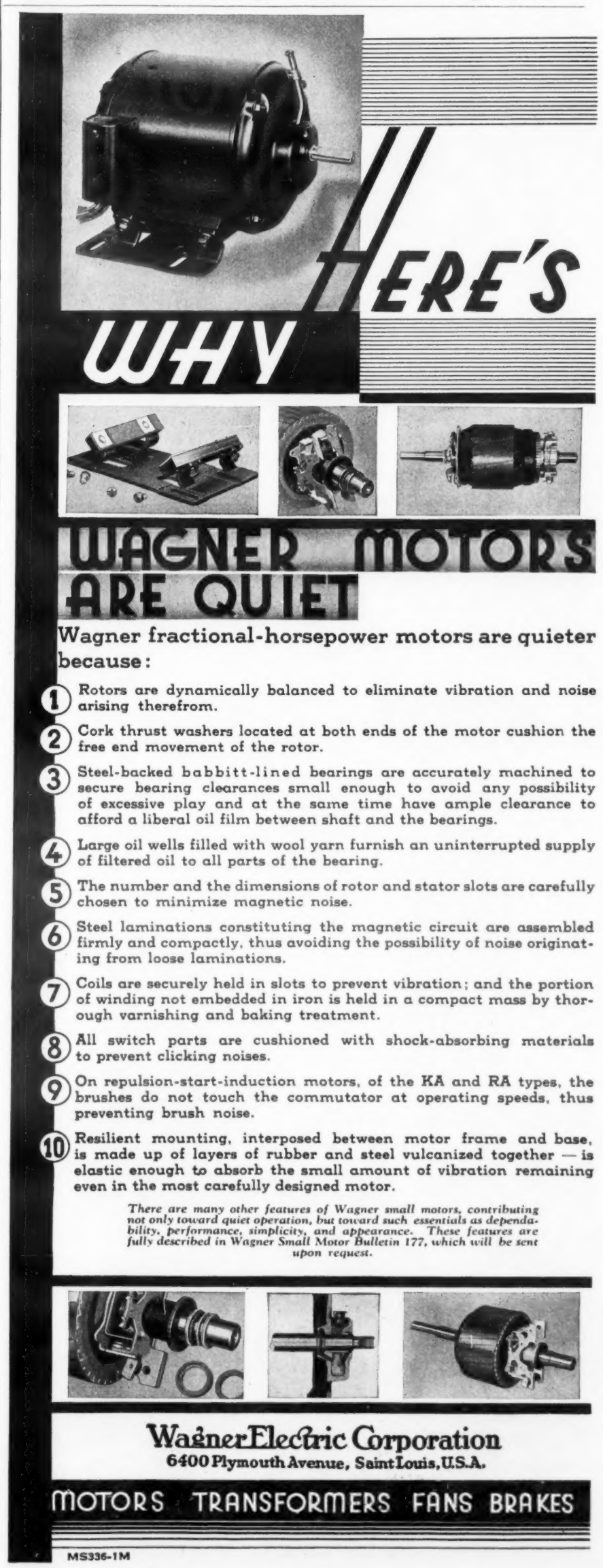
Store operators are taking the lead in installing the new equipment, closely followed by owners of cafes, office buildings, hotels, and apartment buildings, he said.

Figures were cited to show that the demand for office space increased nearly 100 per cent in the United States during 1935, and predictions were made by several of the convention speakers, that an apartment house shortage will exist by the end of the current year.

Air-Conditioning School

NEWARK—A course in air conditioning for employees has been planned by the committee on educational work of Public Service Electric and Gas Co., local utility. The class will meet one night a week.

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4 Large oil wells filled with wool yarn furnish an uninterrupted supply of filtered oil to all parts of the bearing.
5 The number and the dimensions of rotor and stator slots are carefully chosen to minimize magnetic noise.
6 Steel laminations constituting the magnetic circuit are assembled firmly and compactly, thus avoiding the possibility of noise originating from loose laminations.
7 Coils are securely held in slots to prevent vibration; and the portion of winding not embedded in iron is held in a compact mass by thorough varnishing and baking treatment.
8 All switch parts are cushioned with shock-absorbing materials to prevent clicking noises.
9 On repulsion-start-induction motors, of the KA and RA types, the brushes do not touch the commutator at operating speeds, thus preventing brush noise.
10 Resilient mounting, interposed between motor frame and base, is made up of layers of rubber and steel vulcanized together — is elastic enough to absorb the small amount of vibration remaining even in the most carefully designed motor.
There are many other features of Wagner small motors, contributing not only toward quiet operation, but toward such essentials as dependability, performance, simplicity, and appearance. These features are fully described in Wagner Small Motor Bulletin 177, which will be sent upon request.
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MOTORS TRANSFORMERS FANS BRAKES
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Types of Pistons

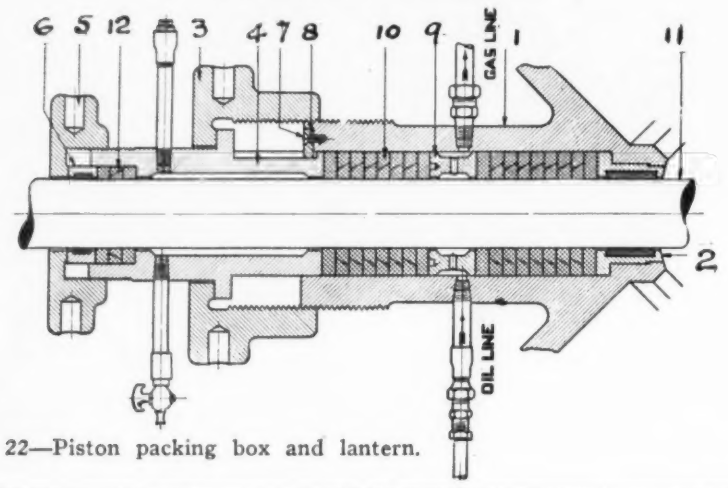

Fig. 22—Piston packing box and lantern.

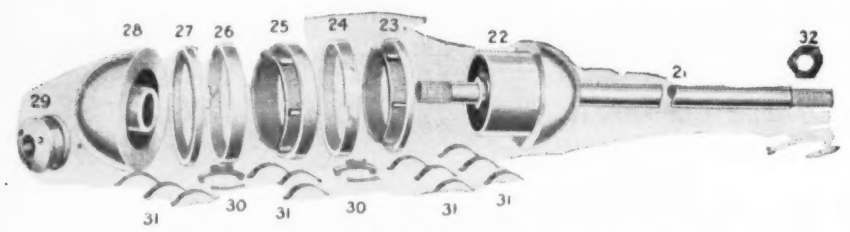

Fig. 23—Old type built-up piston with springs.

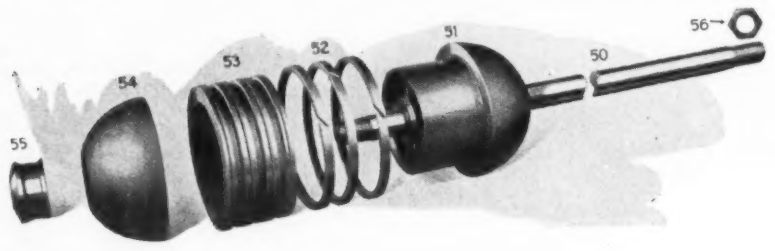

Fig. 24A (above)—New type built-up piston with solid ball rings.

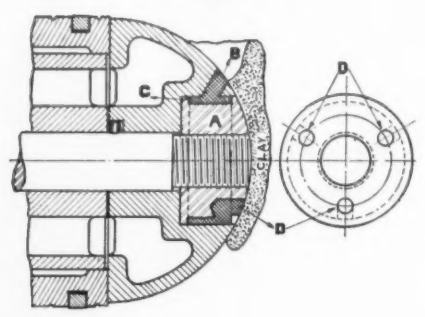

Fig. 24B (left)—Method of locking nut of built-up piston on piston rod.

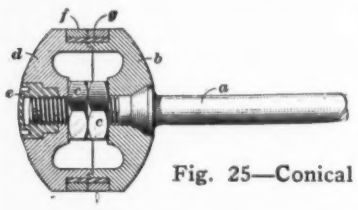

Fig. 25—Conical piston.

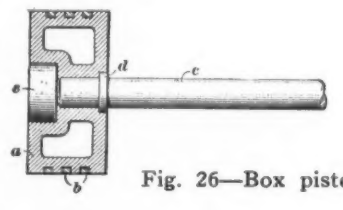

Fig. 26—Box piston.

Fig. 27—Top section and body of full-slipper, single-suction valve, trunk-type piston.

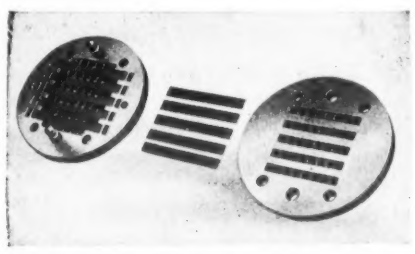

Fig. 28A—Feather valves which fit into top of piston shown in Fig. 28B.

Fig. 28B—Half-slipper, single-suction valve, trunk-type piston used by York.

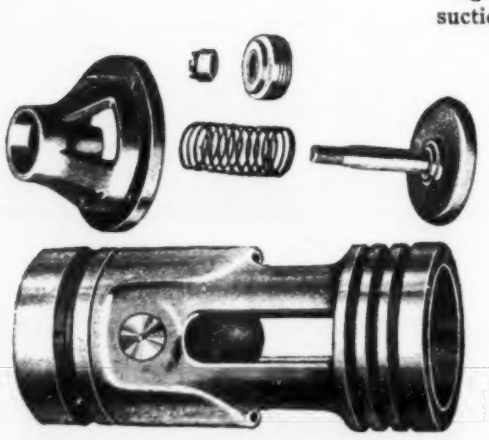

Fig. 28C—Parts of piston shown in Fig. 28B.

The Refrigeration Engineer's Manual

By S. L. Potts

Various Types of Piston and Valve Assemblies Used In Compressors

Chapter 3—Compressors

(Continued from Last Issue)

Cylinder Materials

Cylinders for ammonia compressors are made of close grained gray cast iron or semi-steel castings. The cylinders must be free from all blow holes, relieved of all shrinkage strains by aging, must not have hard or soft spots in the cylinder bore. The castings must have a strength much greater than that produced by the compression of the gases.

The cylinder bore is finished in many different ways depending on the grade of machine intended for. The cheaper grade machine will be rough and finished bored. The best grade machines will be rough and finished bored and the walls of the bore will be honed true and smooth, so that the rings can make a perfect seal. For the best results, the cylinder should be seasoned for some time after the rough machining is done.

Piston Rings

Piston rings for compressors should be made of soft close grained grey cast iron. The rings should be turned from a cylindrical casting somewhat larger than the cylinder bore. The inside bore of the ring is sometimes made eccentric with the outside thus making the ring thicker in one part than in another. The ring is cut in the thin part to make the joint and to permit the ring to spring to place inside the cylinder bore.

The variable thickness is designed to give the ring an even spring pressure against the cylinder walls throughout the entire circumference of the ring. The width of the ring should be easy yet snug fit into the piston grooves. The joints in the rings are made in many different ways.

Suction and Discharge Valves

The design of these valves vary for every different make of machine. The suction valves of vertical single acting compressors are frequently placed in the piston and the discharge valve is placed in the safety head.

In Fig. 30 is shown a vertical single acting twin cylinder enclosed type compressor with the above type of valves and trunk pistons. The suction valve and stem is made from high grade steel, machined to size, heat treated to produce toughness, and ground to the finished sizes. This compressor is manufactured by the Frick Co.

In Fig. 28 is shown an enlarged view of a suction valve and trunk piston for an enclosed type compressor.

In the horizontal type of compressors the suction and discharge valves are placed in the cylinder heads and have various arrangements. Some manufacturers place the valves in cages and secure the whole unit (valve and cage) in the cylinder head. Many improvements have been made in the suction and discharge valves for horizontal compressors.

Fig. 33A shows a suction valve and cage used in radial valve com-

(Concluded on Page 17, Column 1)

Piston Rings

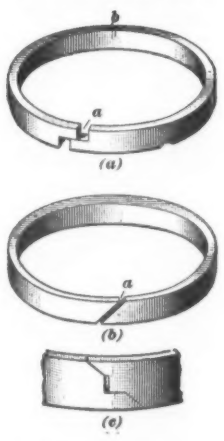

Fig. 29—Common types of piston rings. Above—step cut joint; center—diagnoal joint; below—combination diagonal and step

Preceding Instalments Of Engineers Manual

Chapter I, starting in the Jan. 1, 1936, issue and continued in the Jan. 8 issue, explains the physical laws involved in the process of producing artificial refrigeration and the principal types of systems used. This introductory chapter also defines the terms and units of measurements used frequently in later discussions.

Chapter II, in the Jan. 15 issue gives a comprehensive survey of the characteristics of all the various chemicals which may be used as refrigerants, with the advantages and disadvantages of those most commonly selected in commercial practice.

Chapter III deals with compressors. The first instalment of Chapter III, published in the Jan. 22 issue, explained the function of compressors and the methods used in classifying them.

The second instalment of Chapter III, which appeared in the Jan. 29 issue, discussed the advantages and disadvantages of various types. The third instalment, appearing this week, discusses pistons, piston rings, and suction and discharge valves.

Chapter IV to appear in the next issue of the News (Feb. 12) will present compression of gases.

The Refrigeration Engineers Manual will be offered in book form about May 1, 1936. Approximately 300 pages. Price $3.00 per copy. The Manual in combination with a subscription to the News costs $5.00 if check is sent with order.

Sheffler-Gross to Sell Friez Equipment

PHILADELPHIA — Sheffler-Gross Co., sales engineers in this city, was recently appointed agent for the temperature control equipment manufactured by Julien P. Friez & Sons, Inc.

Vertical Single-Acting Compressor

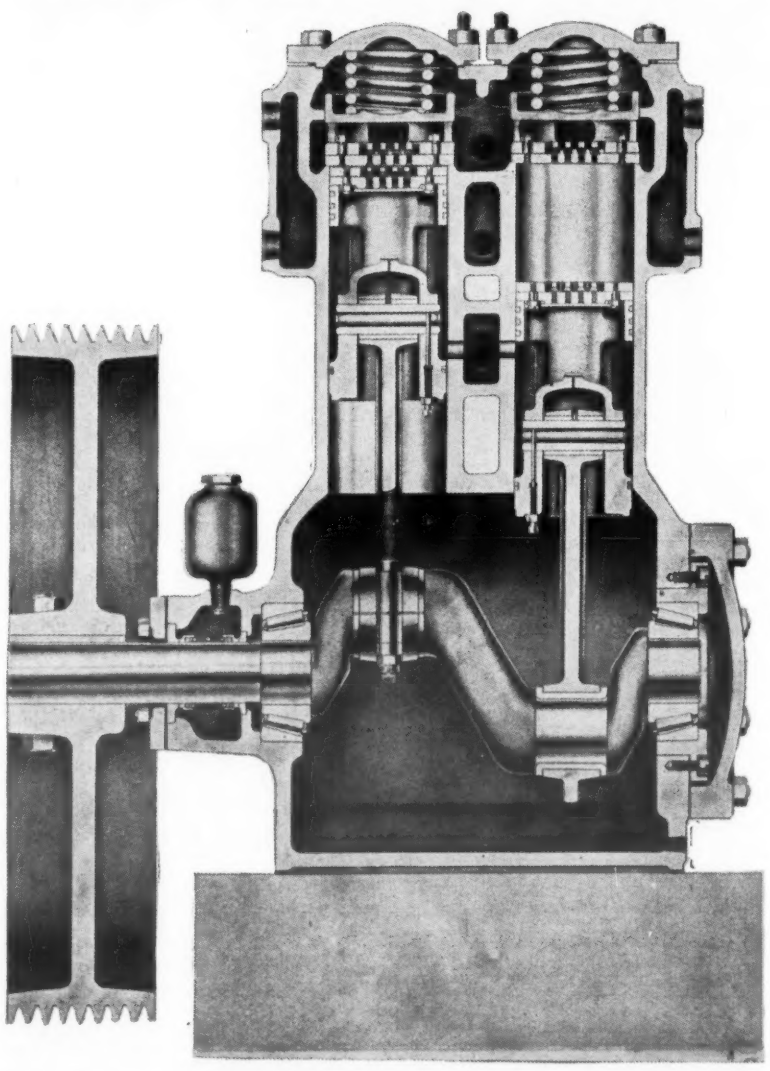

Fig. 30—Vertical single-acting, twin-cylinder compressor of the enclosed type, having trunk piston with feather valves. Carbondale Machine Corp.

Double-Acting Compressors with Radial Valves

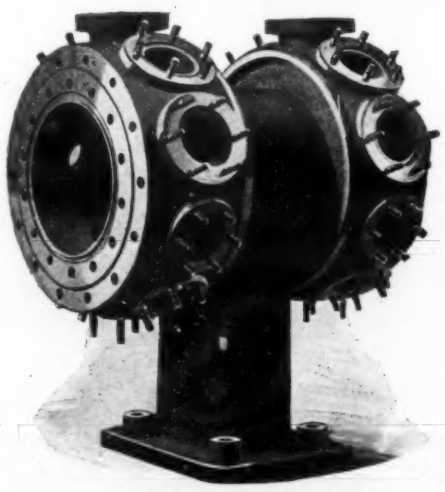

Fig. 31 (left)—Horizontal, double-acting compressor with radial valves, made by Vilter Mfg. Co.

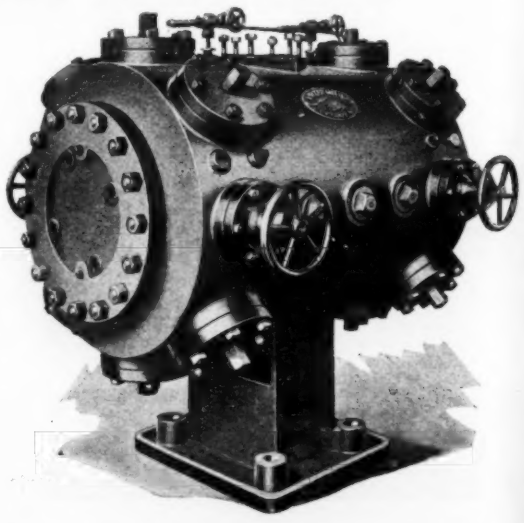

Fig. 32 (right)—Vilter horizontal, double-acting compressor cylinder with radial valve mounted in cylinder.

Types of Piston & Valve Assemblies

(*Concluded from Page 16, Column 4*)

pressor of the horizontal type. The suction valve A is ground to a tight seat in the cage at point J. The cage is made a tight fit into the cylinder head at N and held onto this seat by the cover plate or bonnet D.

The valve stem guide L screws into the cage at the top. Besides acting as a guide, the plunger acts as a cushion piston to seat the valve easily. The leak port for the cushion cylinder is at M. The cage and guide is held in the cylinder head by the cover plate D, exerting its pressure through the heavy spring E. The cover plate also holds the packing F into the joint.

The light spring balances the weight of the moving parts in the valve so as to have it sensitive to slight pressure differences. The heavy spring H acts as a stop to limit the opening of the suction valve by having the collar G come into contact with the spring.

The leak port O puts the pressure onto the cover plate and prevents any possible lifting of the cage from its seat at N. Hole P is for an eye bolt to remove cage from cylinder casting.

In Fig. 34B, a discharge valve is shown similar to Fig. 33A. The pressure of the compressed gases force the valve A from its seat in the cage at J and allows the gases to pass through the cage to the discharge pipe. In all other respects, it is the same as the suction valve.

In Fig. 33B, a discharge valve is view of a plate type valve used in radial valve compressors of the horizontal double acting type. It is composed of three parts, the valve seat, the valve guide plate, and the cover plate. These units are made interchangeable for either suction or discharge by simply reversing the part that is placed in the cylinder first. As shown it is a discharge valve.

In Fig. 36 is shown a sectional view of a feather valve used in horizontal double acting compressors with radial valves in cylinder or in cylinder head. The design is somewhat the same as the plate valve, the main difference is in the feathers and ports which are straight and much shorter than the plate valves that are round valves and ports.

The units are interchangeable for either suction or discharge by simply reversing their position in the valve chest of the cylinder. The valve seat is shown at A. The guard or guide plate at D. This plate has five straight slots cut into the face with a slight curvature, making the slot deeper at the center, and just a loose fit for the thickness of the feathers at the ends of slots.

The five feathers fit into these slots and cannot drop out because they are held snug at the ends. Any unbalanced pressure on the seat side of the feather deflects feather up into the curved slot in the guard. This allows passage of gas through valve.

As soon as the unbalanced pressure is removed under the seat, the feather resumes its normal straight or flat position and covers the seat. The weight of any moving part is very small and permits high speed and quiet operation. Compressors with these valves can be operated at speeds of 400 to 550 r.p.m.

In Fig. 37 is shown a sectional view of a Carbondale compressor cylinder horizontal double acting, open-type construction, with feather valves for suction and discharge arranged radially in the ends of the cylinder casting. The arrangement of the valves and the manner of holding them in position is clearly shown.

There also is shown a double seal on the piston rod so that any leakage past the first stuffing box will be drawn off through the connection to the suction side of the compressor.

Fig. 38 shows a section view of a suction and discharge manifold with the valves. This manifold is used on the vertical twin cylinder single acting trunk piston compressors. It gives full size passages in the crossovers and does away with all the crossover piping.

This manifold has two flanges on the back (not shown here) that bolts the manifold to the cylinders so that the port G connects with the suction port of the cylinders, and port H to the discharge port of the cylinders. All valves are double seated valves so that leakage may be prevented when packing the stuffing boxes on the valve stems.

A is the suction pipe from the evaporator. B is the discharge pipe to the condenser. With the valves set as shown, C and F closed, and E and D open, the evaporator gas will be drawn into the compressor and discharged to the condenser.

To unload the compressor for starting with an electric motor, open F and D and close C and E. The scale trap is placed in the space around G. At the top is placed the safety valve K. The discharge from this valve when it opens is piped to the suction lines of the compressor.

Fig. 39 shows one of the valves installed in manifold shown in Fig. 38.

Feather Valve Locations

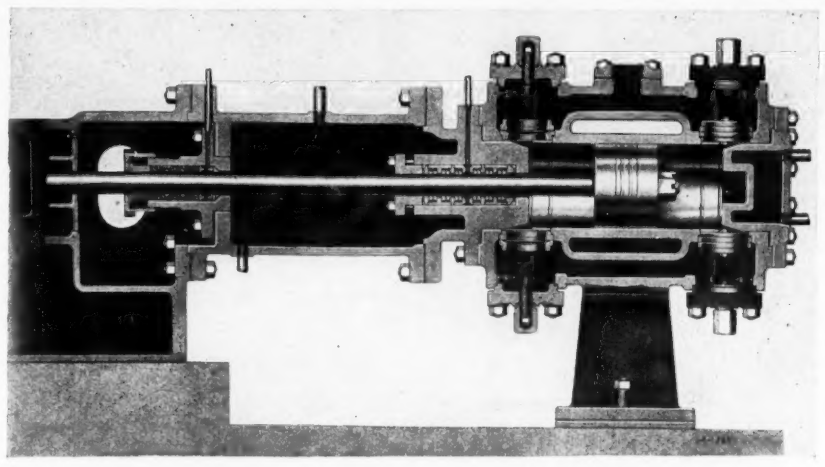

Fig. 37—Sectional view of a Carbondale compressor, showing location of feather valves for suction and discharge.

Types of Suction and Discharge Valves

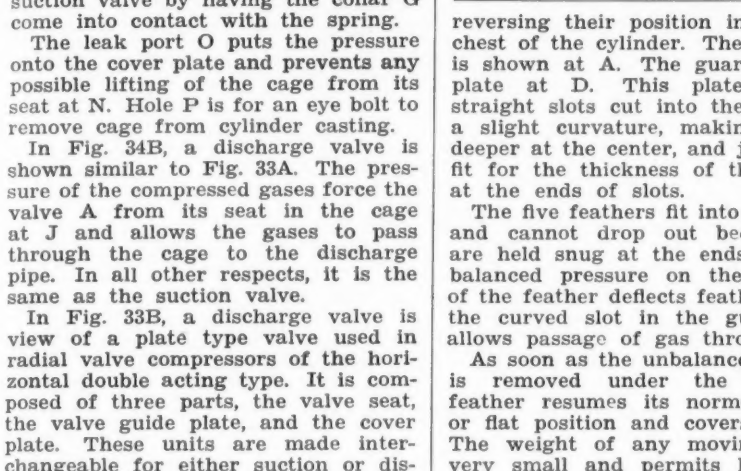

Fig. 33A (left) shows a suction valve and cage for radial valve compressor cylinder; Fig. 33B (right) shows discharge valve of similar type.

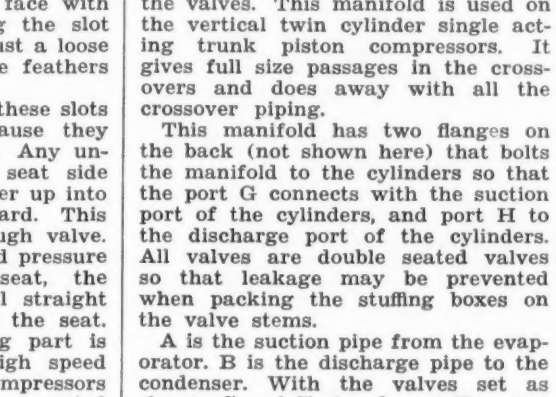

Fig. 34—A plate-type suction valve in cylinder. Made by Vilter Mfg. Co.

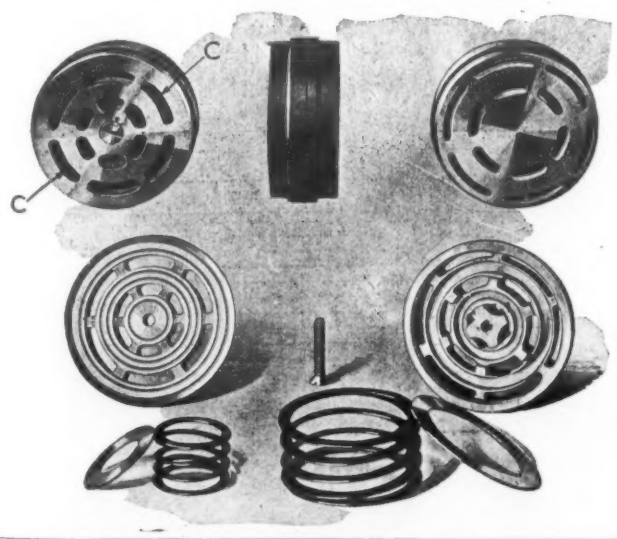

Fig. 35 (left)—Plate-type suction and discharge valves showing parts used.

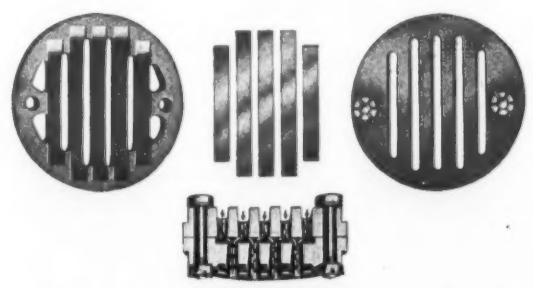

Fig. 36 (above)—Carbondale feather valves for horizontal compressor with radial valves in cylinder.

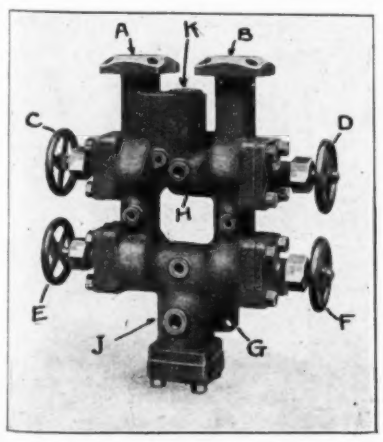

Fig. 38 (left)—View of suction and discharge manifold with valves.

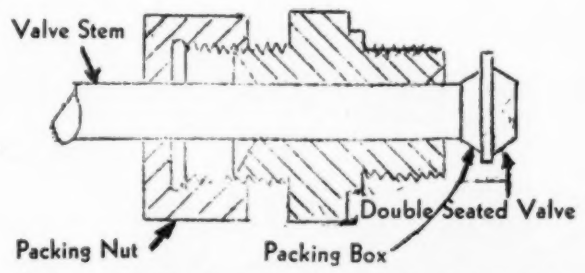

Fig. 39 (above)—Sketch of double-seated valve used in manifold.

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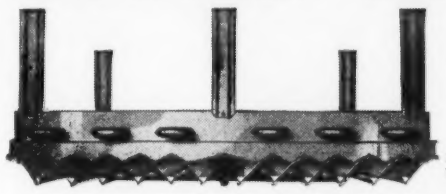

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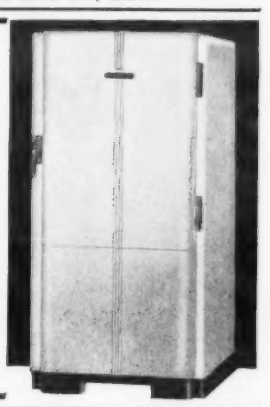

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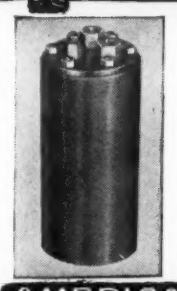

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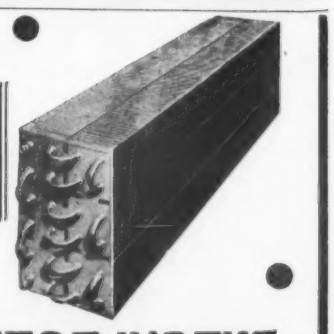

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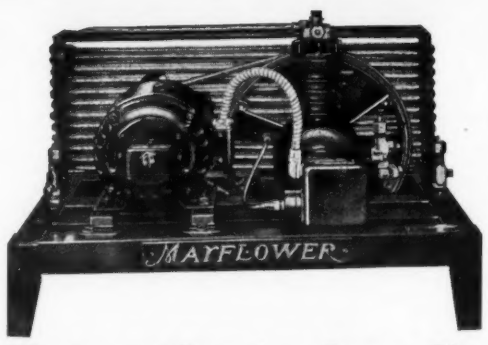

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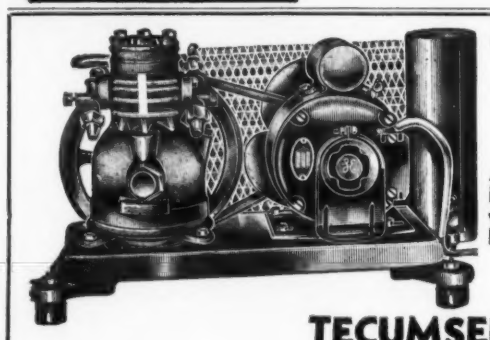

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No. 20 for 1/2" to 1 5/8" o.d. inc.... 2.75
No. 30 for 1" to 2 1/8" o.d. inc.... 3.75

HENRY VALVE CO.

1001-19 N. Spaulding Ave., Chicago, Ill.

IF YOUR JOBBER CAN'T SUPPLY YOU, ORDER DIRECT

THE REFRIGERATION LIBRARY—VOL. 3

MASTER SERVICE MANUAL

WHAT TO DO and HOW TO DO IT for all types of household systems

By E. M. NEWCUM

BUSINESS NEWS PUBLISHING CO. Publishers of ELECTRIC REFRIGERATION NEWS

The Master Service Manual ($3.00 per copy) includes the necessary instructions for servicing all the fundamental types of household systems. Detailed instructions for the servicing of more than a dozen "orphan makes" are also included. Off the press this month.

The Refrigeration and Air Conditioning Specifications Book ($3.00 per copy) will contain detailed comparative data which every dealer, salesman, and service man has been wanting. To be published March 1, 1936.

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THE REFRIGERATION LIBRARY—VOLUME 4

REFRIGERATION and Air Conditioning SPECIFICATIONS

For ALL MODELS and MAKES HOUSEHOLD and COMMERCIAL Including New Designs for 1936

BUSINESS NEWS PUBLISHING CO. Publishers of ELECTRIC REFRIGERATION NEWS

PURO ELECTRIC WATER COOLERS

Thoroughly reinforced all steel attractively finished cabinets.

Different models of varying capacities.

Write for details and sales prices.

Puro Filter Corporation of America

440 Lafayette Street, New York City Spring 7-1800

California Distributors Adopt Code of Ethics

(Concluded from Page 1, Column 2)

deferred payment terms, consignment to dealers, method of dealer payment, charge for display material, and method of quoting prices.

Complete text of resolutions follows:

The subject of economic trade and ethical practices of the industry was discussed, with the result that definite action was taken in the form of resolutions recommending that certain practices be promulgated. They are as follows:

1. RESOLVED this Association recommend to its constituent members the adoption of the policy that no discounts whatsoever be allowed to the ultimate consumer on refrigerators for his personal use or to civic, institutional and/or similar types of wholesale customers on merchandise for the personal use of employees of such customers, bona fide sales by such wholesalers to their own employees of refrigerators for the personal use of such employees excepted.

FURTHER RESOLVED it be recommended to the constituent members of this Association that they exert their best efforts to induce dealers holding retail franchises, to observe the spirit and letter of this recommendation.

2. RESOLVED it be recommended to the constituent members of this Association that no discount on refrigerators be made to apartment or flat operators, or group builders for less than a minimum original order of three machines, and that a stipulated delivery and billing date be made a part of the order; bona fide repeat or fill in orders excepted.

3. RESOLVED the practice of the selling refrigerators by retailers to the public on deferred payment basis without interest is uneconomic, unfair competition, not to the best interests of the retailer, and not in conformity with sound and ethical trade practices; and therefore it is

Recommended to the constituent members of this Association that they request their retail dealers to add an interest or carrying charge at the rate of at least 6 per cent flat per annum on all unpaid balances in deferred retail sales, in addition to the recommended and published list price of the refrigerator sold, except in F.H.A. or E.H.&F.A. financed paper through banks, and

It is further recommended that distributors request retailers to refrain from selling at less than the established resale prices, and that it is fair and ethical business practice to comply with the spirit and letter of this recommendation.

4. RESOLVED it be recommended to the constituent members of this Association that no refrigerators be consigned to dealers for resale or display purposes.

5. RESOLVED it be recommended to the constituent members of this Association that in order to conform with sound and ethical trade practices that the terms of sale of refrigerators be on a cash basis; method of handling optional with wholesalers as follows: C.O.D.; S.D.B.L.; check with order; check mailed on receipt of invoice.

6. RESOLVED it be recommended to the constituent members of this Association that all display or promotional materials shall be charged to the dealers at not less than distributors' landed cost.

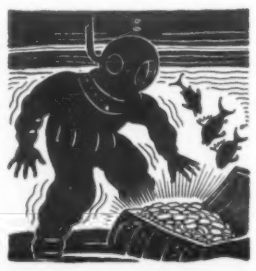
7. RESOLVED it be recommended to the constituent members of this Association that all price quotations shall be F.O.B. warehouse of distributor, but in no case shall a distributor pay carrying charges to any community wherein he does not maintain an established office, warehouse and warehouse stock.

8. RESOLVED it be recommended to the constituent members of this Association that in order to secure uniformity in the industry, the aforesaid recommendations become effective January 1, 1936.

Manufacturers Are Taxed $309,109 in November

WASHINGTON, D. C.—Taxes totaling $309,109 were paid by refrigeration manufacturers during November, 1935, compared with $147,376 in the same month of 1934.

INFORMAL TALK NUMBER 36



The Trained Service Man. A Real Treasure

We know you are sold on the advantages of hiring only trained men to handle your installation and service work. We don't have to prove that a well trained man is a real treasure. But you have no time to go on a "treasure hunt". No need to do it either—just write R-A-C-I.

As the one organization which enjoys the endorsement and confidence of the leading manufacturers, many of whom have appointed their own engineers to assist us, we are best able to supply you with the kind of men you need and want—trained as you want them trained.

The REFRIGERATION AND AIR CONDITIONING INSTITUTE

2130-2158 LAWRENCE AVENUE • CHICAGO

Sales Figures

California Shows Largest Gain in Nema Sales-by-States Tabulation

	1935	1934	Per Cent of Increase or Decrease
Alabama	21,529	14,283	+50%
Arizona	5,211	3,256	+60%
Arkansas	9,072	7,885	+15%
California	112,147	58,476	+90%
Colorado	11,073	8,969	+23%
Connecticut	21,847	15,851	+37%
Delaware	3,033	2,599	+16%
Dist. of Columbia	10,887	10,813	+½%
Florida	25,369	14,923	+69%
Georgia	26,174	24,777	+ 5%
Idaho	6,477	3,756	+72%
Illinois	140,006	91,545	+52%
Indiana	35,744	29,981	+19%
Iowa	22,349	17,414	+28%
Kansas	17,624	18,862	— 7%
Kentucky	16,449	16,737	— 2%
Louisiana	13,796	8,442	+63%
Maine	7,013	5,942	+18%
Maryland	20,077	21,732	— 8%
Massachusetts	59,034	44,151	+33%
Michigan	61,970	45,635	+35%
Minnesota	20,276	15,087	+34%
Mississippi	6,560	4,372	+50%
Missouri	42,273	45,319	— 7%
Montana	5,826	4,433	+31%
Nebraska	15,280	12,186	+25%
Nevada	1,825	1,102	+65%
New Hampshire	5,139	4,122	+24%
New Jersey	62,070	50,513	+22%
New Mexico	3,125	2,163	+44%
New York	174,465	160,539	+ 8%
North Carolina	23,415	17,584	+32%
North Dakota	3,708	2,715	+36%
Ohio	95,569	76,979	+24%
Oklahoma	15,612	15,170	+ 2%
Oregon	13,638	13,152	+ 3%
Pennsylvania	114,253	102,802	+11%
Rhode Island	7,233	6,756	+ 7%
South Carolina	11,986	8,434	+42%
South Dakota	4,702	3,665	+28%
Tennessee	22,940	22,681	+ 1%
Texas	58,172	45,764	+27%
Utah	6,700	5,057	+32%
Vermont	3,146	2,609	+20%
Virginia	20,719	19,244	+ 7%
Washington	20,472	15,527	+31%
West Virginia	14,555	15,381	— 6%
Wisconsin	23,822	16,525	+44%
Wyoming	2,290	1,970	+16%
Total	**1,446,652**	**1,157,880**	

73,703 Household Units Sold by 14 Members Of Nema in December, 1935

The following 14 member companies of the Refrigeration Division of the National Electrical Manufacturers Association (Nema) reported household refrigerator sales for December, 1935: Apex Electrical Mfg. Co., Crosley Radio Corp., Frigidaire Corp., General Electric Co., Gibson Electric Refrigerator Corp., Kelvinator Corp., Leonard Refrigerator Co., Norge Corp., Servel, Inc. (export only), Stewart-Warner Corp., Sunbeam Electric Mfg. Co., Uniflow Mfg. Co., Universal Cooler Corp., and Westinghouse Electric & Mfg. Co. Member companies not reporting included: Jomoco, Inc., Merchant & Evans Co., and Sparks-Withington Co.

The sales of the reporting companies do, however, include units manufactured for the following concerns: Major Appliance Corp., Montgomery Ward & Co., Potter Refrigerator Corp., Sears, Roebuck & Co., and Truscon Steel Co.

SALES FOR DECEMBER, 1935

	Domestic Quantity	Domestic Value	Canadian Quantity	Canadian Value	Other Foreign Quantity	Other Foreign Value
Lacquer (Exterior) Cabinets Complete						
1. Chest	129	$ 6,166	0*	$ 0*	19†	$ 940†
2. Less than 3 cu. ft.	22	1,274	.....	.....	18	1,046
3. 3 to 3.99 cu. ft.	2,920	166,639	3	907	449	25,918
4. 4 to 4.99 cu. ft.	11,430	749,585	220	16,110	1,009	65,730
5. 5 to 5.99 cu. ft.	14,913	1,145,903	43	3,121	726	57,687
6. 6 to 6.99 cu. ft.	10,298	877,192	65	5,670	429	40,892
7. 7 to 7.99 cu. ft.	3,788	400,337	191	21,331	105	11,506
8. 8 to 9.99 cu. ft.	1,720	193,812	2	220	20	2,450
9. 10 to 12.99 cu. ft.	.....	.....	2	335	.....	.....
10. 13 cu. ft. and up	.....	.....	.....	.....	.....	.....
11. Total Lacquer	**45,220**	**3,540,908**	**526**	**47,694**	**2,737**	**204,289**
Porcelain (Exterior) Cabinets Complete						
12. Up to 4.99 cu. ft.	1,434	110,349	10	970	.....	.....
13. 5 to 5.99 cu. ft.	4,922	446,463	4	335	139	12,666
14. 6 to 6.99 cu. ft.	7,339	773,704	3	304	103	10,458
15. 7 to 7.99 cu. ft.	3,486	435,235	2	235	158	20,642
16. 8 to 9.99 cu. ft.	1,710	235,799	7	922	77	11,602
17. 10 to 12.99 cu. ft.	395	74,744	1	170	25	4,181
18. 13 cu. ft. and up	96	22,237	.....	.....	39	9,347
19. Total Porcelain	**19,382**	**2,098,531**	**27**	**2,936**	**541**	**68,896**
20. Total Lines 11 and 19	**64,602**	**5,639,439**	**553**	**50,630**	**3,278**	**273,185**
21. Separate Systems ¼ Hp. or Less	4,269	174,090	.....	.....	619	30,356
22. Separate Household Evaporators	202	3,732	13	325	167	2,820
23. Total Lines 20, 21, 22	**69,073**	.....	**566**	.....	**4,064**	.....
24. Condensing Units ¼ Hp. or Less	214	13,047	9	587	495	24,383
25. Cabinets—No Systems	2,567	73,679	1	114	115	3,022
26. Total Household	.....	**$5,903,987**	.....	**$51,656**	.....	**$333,766**

*This figure includes credits reported by one company
†This figure includes sales reported by several companies, and are indicated in the report as to be subtracted from the totals.

Sales by States for December

The following report of sales by states for December, 1935, was made by the 14 member companies of Nema listed above.

States and Territories	Quantity of Household Low Sides
Alabama	1,694
Arizona	99
Arkansas	49
California	7,886
Colorado	640
Connecticut	573
Delaware	204
Dist. of Columbia	259
Florida	898
Georgia	1,052
Idaho	162
Illinois	6,294
Indiana	1,257
Iowa	313
Kansas	452
Kentucky	753
Louisiana	490
Maine	126
Maryland	887
Massachusetts	2,997
Michigan	4,730
Minnesota	1,326
Mississippi*	31
Missouri	1,740
Montana	155
Nebraska	651
Nevada	125
New Hampshire	119
New Jersey	3,636
New Mexico	63
New York	9,880
North Carolina	562
North Dakota	125
Ohio	4,252
Oklahoma	280
Oregon	621
Pennsylvania	7,242
Rhode Island	182
South Carolina	379
South Dakota	130
Tennessee	629
Texas	1,373
Utah	95
Vermont	80
Virginia	1,352
Washington	639
West Virginia	501
Wisconsin	1,097
Wyoming	55
Total United States	**69,073**
Canada	566
Other Foreign (Incl. U. S. Possessions)	4,064
Total for World	**73,703**

*This figure includes sales reported by several companies.

Classified

RATES: Fifty words or less, one insertion $2.00, additional words four cents each. Three insertions $5.00, additional words ten cents each.

PAYMENT in advance is required for advertising in this column.

REPLIES to advertisements with Box No. should be addressed to Electric Refrigeration News, 5229 Cass Ave., Detroit, Mich.

POSITIONS AVAILABLE

WANTED—By large manufacturer young engineer technically trained and experienced in thermodynamic analysis of continuous type absorption refrigeration units. State qualifications fully in first letter. Box 767, Electric Refrigeration News.

POSITIONS AVAILABLE as factory sales representatives for thoroughly experienced commercial refrigeration and air conditioning men. Must have practical knowledge of sales engineering and actual application work. Reply should give full details of experience, sales producing ability, territory previously covered, age, family connections, habits, past earnings and references. Box 766, Electric Refrigeration News.

IF YOU are calling on refrigeration jobbers and distributors, we have an extremely interesting deal, providing territory is open. We can assure you it will be well worth your while to drop us a line advising what territory you are now travelling and full information about yourself. Betz Corp., Betz Bldg., Hammond, Ind.

EQUIPMENT WANTED

WE ARE on the market for any quantity of used or close out commercial refrigeration equipment, condensing units, coils, air conditioning apparatus, etc. Advise by mail what you have to sell, make, model, condition, price, etc. Address Box No. 135, Madison Square Sta., New York, N. Y.

EQUIPMENT FOR SALE

FOR SALE, two ton ammonia ice machine made by Creamery Package Co. of Chicago, Ill. Machine practically new offered at one-half price. Address, Superior Cleaners & Dyers, 111 S. Court St., Montgomery, Ala.

DEALERS AND SERVICEMEN. Used refrigerators "As Is". Recondition, spray them yourself, save money. Kelvinators $19.00, Frigidaires $25.00, Copelands $21.50, Servels $19.00. General Electric, Mayflower, Electrolux, others. Frigidaire two-cylinder ¼-h.p. units, with 2-tray float evaporators $19.00 each. Pilgrim Refrigeration Co., 43-47 39th Place, Long Island City, N. Y.

FEDERAL REFRIGERATOR CORP., 57 E. 25th St., New York, offers brand new Mullins, 3 tray porcelain evaporators, complete with trays, dividers, porcelain hanger, front porcelain baffle, $5.95. Brand new American Radiator expansion valves, $2.35. Thermostatic expansion valves, $3.55. Automatic door lights complete 55¢. Refrigerator shelving all sizes 10¢ to 50¢.

ARTIFICIAL FOOD DISPLAYS

ARTIFICIAL FOOD DISPLAYS at prices you can afford to pay. A realistic food set of meats, fruits and vegetables for every make refrigerator. Complete sets from $3.00 to $6.00. Write your source of refrigerator supply or direct to Cincinnati Doll Co., 311-313 E. Twelfth St., Cincinnati, Ohio.

HERMETIC UNITS REPAIRED

HERMETIC SEALED UNITS REBUILT and some exchanged; Majestics, all models, $20, G.E. $25 & $32.50; Gibson sealed and open type $20; Bohns $20; all guaranteed; F.O.B.; other prices on request; wholesale only; prompt service. Standard makes of refrigerators complete, rebuilt and refinished like new, sold. We also export. We are in a position to represent for a few additional manufacturers' factory service in the Metropolitan area. New York City's largest service organization. Interboro Refrigerator Co., 350 Pearl St., Brooklyn, N. Y.

GENERAL ELECTRIC SEALED UNITS—repaired, rebuilt, exchanged. Guaranteed service. Our modern shop is especially equipped to efficiently repair these units. Prices low and workmanship the best. Give model number when writing. Immediate service. Rex Refrigeration Service, Inc., 446 East 79th St., Chicago.

PATENTS

HAVE YOUR patent work done by a specialist. I have had more than 25 years' experience in refrigeration engineering. Prompt searches and reports. Reasonable fees. H. R. Van Deventer (ASRE), Patent Attorney, 342 Madison Avenue, New York City.

PATENT FOR SALE

REFRIGERATOR UNIT DEFROSTER patent for sale. Eliminates turning off current to melt accumulation of ice on cooling unit and rising refrigerator temperature. Very sanitary. Eliminates recirculation of impure frost moisture from cooling unit and continually keeps low temperature in refrigerator. Box 760, Electric Refrigeration News.

BRUNNER
Send for the New
REFRIGERATION CATALOG
Eight Models of Compressors
Forty-one Models of Highsides
from 1/6 H. P. to 15 H. P.
BRUNNER MANUFACTURING CO.
UTICA, N. Y.

Questions

Dollar Volume in 1935

No. 2664 (Association, Illinois)—"Thank you very much for your letter of Jan. 14, 1936, enclosing tear sheet of ELECTRIC REFRIGERATION NEWS for Jan. 1, 1936, giving figures on sales of household refrigerators for the year 1935.

"We are wondering if instead of this estimated figure of dollar volume of sales you may have definite figures on dollar volume of sales for some part of 1935. We should appreciate receiving this information if you have it at hand."

Answer: We cannot give you a *definite* figure covering retail dollar volume of sales for any part of 1935, because there is no way in which such figures are made available.

Best thing you might do is to again refer to the tear sheet of page 1 of the Jan. 1 issue of ELECTRIC REFRIGERATION NEWS, and under the heading of "November Sales Set Record" take the number of sales of the industry through November and multiply it by the estimated retail sales price of units this year ($166) to get the dollar volume.

The estimated average retail price figure is based on substantial facts and is thought to be quite accurate.

Source of Silica Gel

No. 2665 (Service Firm, Massachusetts)—"Kindly inform us where we can obtain Silica Gel in small quantities?"

Answer: The 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY lists the Silica Gel Corp., Baltimore Trust Bldg., Baltimore, Md., as a manufacturer of Silica Gel.

Refrigerator & Auto Ownership

No. 2666 (Writer, Missouri)—"Several months ago H. C. Doss of the Midwest Electric Appliances, Inc., quoted some figures to me on the number of electrical refrigerators owned by persons in a certain income bracket as compared with the number of automobiles owned by that same group. I am very anxious to obtain these figures for use in a trade paper article (on dry goods merchandising) and Mr. Doss suggested you might have them at hand.

"As I remember, the report Mr. Doss had was compiled from a survey made in cities of 100,000 and under. If you could give me these figures for lower, medium, and upper income brackets or tell me where I might obtain such figures, I should greatly appreciate it."

Answer: On pages 66 and 67 of the 1935 REFRIGERATION AND AIR CONDITIONING MARKET DATA BOOK is a tabulation entitled "Real Property Inventory" which gives ownerships of refrigerators, automobiles, and other data on a total of 2,612,000 families having a total of 9,074,000 individuals residing in 64 different cities.

McCORD Refrigeration PRODUCTS
COMMERCIAL EVAPORATORS
DOMESTIC EVAPORATORS
CONDENSERS
METLFLEX ICE TRAYS
SPIRAL FINNED TUBING
AIR CONDITIONING SURFACE
McCORD RADIATOR & MFG. CO.- DETROIT

Concerning Ted McGrath

No. 2667 (Dealer, Florida)—"Can you tell me the present location of H. F. ('Ted') McGrath, once with Kelvinator, and more recently with Major Appliances? I know he is in New York, but with whom?"

Answer: H. F. McGrath has just been appointed to the position of eastern regional sales manager for Universal Cooler Corp. His address is 325 E. 57th St., New York City.

Data on Research Residence

No. 2668 (Manufacturer, Michigan)—"In the May 22, 1935, issue of ELECTRIC REFRIGERATION NEWS, there occurs an article on Detroit Edison Experimental Air-Conditioned Home.

"We do not know whether you have other material concerning experimental results in residential air conditioning, but should you have any further information, we would appreciate your forwarding this to us."

Answer: A study in residential air conditioning was made by the Experimental Engineering Station at the University of Illinois in its Research Residence. An article concerning some of the experimental work in this house was published in the Feb. 27, 1935, issue of the NEWS.

Service Manual Contents

No. 2669—"In reading the REFRIGERATION NEWS, I saw your advertisement for the 400-page Master Mechanics Manual. I would like further information regarding this book.

"Does this book explain the characteristics of various machines, and their working principles? Does it answer questions concerning moisture in methyl chloride jobs (refering to compressors), actions, symptoms?

"Questions like — Will activated alumina dissolve, when in the presence of alcohol in a system, as calcium chloride, when used as a drier?

"I have several books, now in my possession, but they don't tell me what I want to know. They explain pumping down, and installing valves and controls and such, but I am in desperate need of technical advice and help.

"If your book has what I need, I will be glad to place my order for one.

"I hope you understand my position. I have wasted money trying to get this information, and I am just skeptical."

Answer: K. M. Newcum, author of the MASTER SERVICE MANUAL, replies as follows to the query:

"You can assure the writer that the bulk of his questions are thoroughly answered in this MASTER SERVICE MANUAL.

"Concerning the third paragraph of his letter and in particular where he asks about activated alumina in the presence of alcohol in the system when used as a drier, I might answer this question as follows: On tests made in the duPont laboratories by Mr. R. J. Thompson, refrigeration engineer, Kinetic Chemical Co., I believe it was found that activated alumina does *not* dissolve even in the presence of moisture or alcohol in a refrigerating system when used as a drier. It was found that calcium chloride *did* dissolve.

"The MASTER SERVICE MANUAL is *not* a technical book in any sense of the word, but in a practical manner answers most of the problems pertinent to refrigeration."

Consumers Research

No. 2670—"I wish to subscribe to the ELECTRIC REFRIGERATION NEWS and would like to have back copies beginning Jan. 1. If you would be kind enough to send your subscription rates I shall send you the required amount by return mail.

"Sometime last summer in one of your May editions, I believe, there appeared an article concerning the Consumers Research Bureau. I have tried to find this particular issue but so far have failed and as I am anxious to obtain this, to me, important article, I was wondering if you at your convenience would locate said issue and send it to me."

Answer: You will find references to Consumers Research in the following issues of ELECTRIC REFRIGERATION NEWS:

July 4, 1934—Consumers Research on refrigerants.

Aug. 8, 1934—Concerning threat of Consumers Research to bring suit against the NEWS.

July 3, 1935—Editorial mentioning activities of Consumers Research.

July 17, 1935—Reference to Consumers Research in "What Others Say."

May 22, 1935—Consumers Research mentioned in a letter to the NEWS, and answer.

"GENUINE DETROIT"
HEATING, REFRIGERATING AND AIR CONDITIONING CONTROLS
DETROIT LUBRICATOR COMPANY
DETROIT, MICHIGAN, U.S.A.
Canadian Representative—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, Montreal, Toronto, Winnipeg

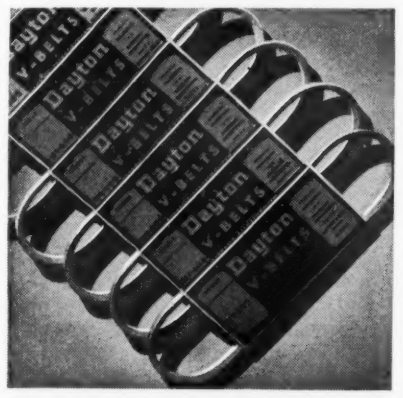
The Buyer's Guide

Suppliers Specializing in Service to the Refrigeration and Air Conditioning Industries

KOCH COMMERCIAL REFRIGERATOR CABINETS
All types and sizes of heavily insulated refrigerators and display cases.
WANTED— DISTRIBUTORS and SALES AGENTS
Attractive sales proposition. Some good territories available. Many exclusive features. Write for information, and submit your qualifications.
KOCH REFRIGERATORS, North Kansas City, Mo.

3600 Line of Display Cases—
These cases afford more square feet of display space than many other cases considerably larger Two sizes are available—14 and 19¼ square feet of display—and you have your choice of Porcelain or DuLux finish.
Among the features are extra large rubber composition sliding doors; extra height doors for storage department, full view of illuminated display section; removable intermediate shelf, and 3" approved insulation.
For real convenience, economy, room and accessibility these cases cannot be equaled. Sold only through Dealers and Jobbers.
Write for complete catalog information
GLOEKLER MANUFACTURING COMPANY
429 Fourth Avenue, Pittsburgh, Pa.

STEELCRAFT
REFRIGERATOR CABINETS
WE MANUFACTURE DISTINCTIVE FOUR AND SIX CU. FT. MODELS
WRITE, WIRE, OR PHONE FOR PRICES
STEELCRAFT INDUSTRIES, INC.
4851 SPRING GROVE AVE.
CINCINNATI, OHIO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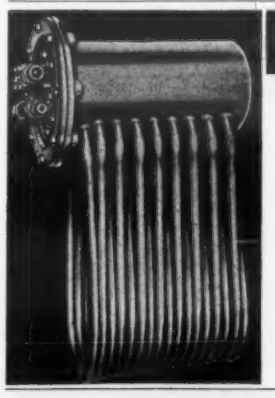
DAYTON V-BELTS
● Silent, gripping transmission, year in and year out. No slipping . . . no twisting . . . no whipping. That's Dayton V-Belt performance. A nearby distributor can quickly supply you with Dayton V-Belts, especially built for all makes of electric refrigerators, washers and other appliances. Write today for price list and full information.
THE DAYTON RUBBER MANUFACTURING CO.
DAYTON, OHIO
The World's Largest Manufacturer of V-Belts

SILVER PISTON RINGS SEAL
THE ONLY PISTON RING DESIGNED & DEVELOPED Exclusively for Refrigeration
The Ring with a bearing face. A Bearing for the ring against the cylinder wall.

Longer Life
Less Friction
Better Seal
No Scuffing
Burnishing Cylinder
DEALERS — JOBBERS — SERVICE MEN
Write for Details—SKINNER CHUCK CO., NEW BRITAIN, CONN.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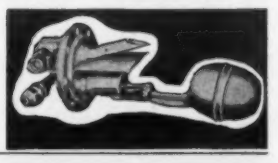
. . . . in the fine art of recalibration of float valves and the silver soldering of evaporation coils . . . for all makes of Ice Cream Cabinets.
WE MANUFACTURE AND REPLACE . . . Monel Tops Enamel Panels • Tanks Rims and Rim Sleeves . . . all other parts for all make cabinets.
STANGARD PRODUCTS
A Division of Standard Body Corp.
430 E. 104th Street, New York
Write for Details


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Showing America's Biggest Line of
REFRIGERATION PARTS AND SUPPLIES
We are large, dependable refrigeration supply distributors carrying a large stock of nationally known parts and supplies. All shown in a new complete net price catalog—gladly sent on request to refrigeration dealers and service companies. Write today on your letter-head.
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AIR CONDITIONING AND COMMERCIAL
The HARRY ALTER CO. Inc.
Main Offices
1728 S. Michigan Ave. Chicago, Ill.